United States Patent [19]

Miyahara

[11] **3,892,518**

[45] **July 1, 1975**

[54] **LIQUID FUEL BURNER FOR BURNING LIQUID FUEL IN GASIFIED FORM**

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[73] Assignee: **Dowa Co., Ltd.,** Tokyo, Japan

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Apr. 20, 1974	Japan	49-44728
Nov. 26, 1973	Japan	48-135872[U]
Apr. 11, 1974	Japan	49-41384[U]

[52] **U.S. Cl.** **431/168;** 239/214.11; 239/214.17

[51] **Int. Cl.** **F23d 11/04**

[58] **Field of Search** 431/168, 169; 239/214.11, 239/214.17, 222

[56] **References Cited**

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Attorney, Agent, or Firm—Hill, Gross, Simpson, Van Santen, Steadman, Chiara & Simpson

[57] **ABSTRACT**

A liquid fuel burner in which a fuel gasifying member is mounted for rotation on the rotary shaft extending through the main body of the burner having a bottom wall formed therein with a recess. A gasified fuel air mixing member is mounted on the lower end portion of the fuel gasifying member to define therebetween a scattering gap. A gasified fuel blowing passageway is defined between the gasified fuel-air mixing member and the recess which cooperate to form a gasified fuel-air mixture storing chamber. Liquid fuel and air under pressure are supplied to the rotating fuel gasifying member, and atomized liquid fuel is scattered through the scattering gap and ignited to heat the fuel gasifying member from outside for promoting gasification of the liquid fuel within the fuel gasifying member. A mixture of gasified fuel and air is blown out through the gasified fuel blowing passageway to ensure that combustion of the gasified fuel in blue flames is sustained. The burner further comprises a gas chamber disposed on the marginal portion of the bottom wall and formed therein with blowing openings, a cylindrical member formed therein with blowing openings and extended from the open end portion of the fuel gasifying member, or a gasified fuel blowing and burning body disposed on the marginal portion of the bottom wall and formed therein with blowing openings, so that the flames of combustion of the gasified fuel can be blown out in a layer of substantial thickness and the force of the flames can be reduced to prevent the main body and the fuel gasifying member from damage by combustion.

4 Claims, 13 Drawing Figures

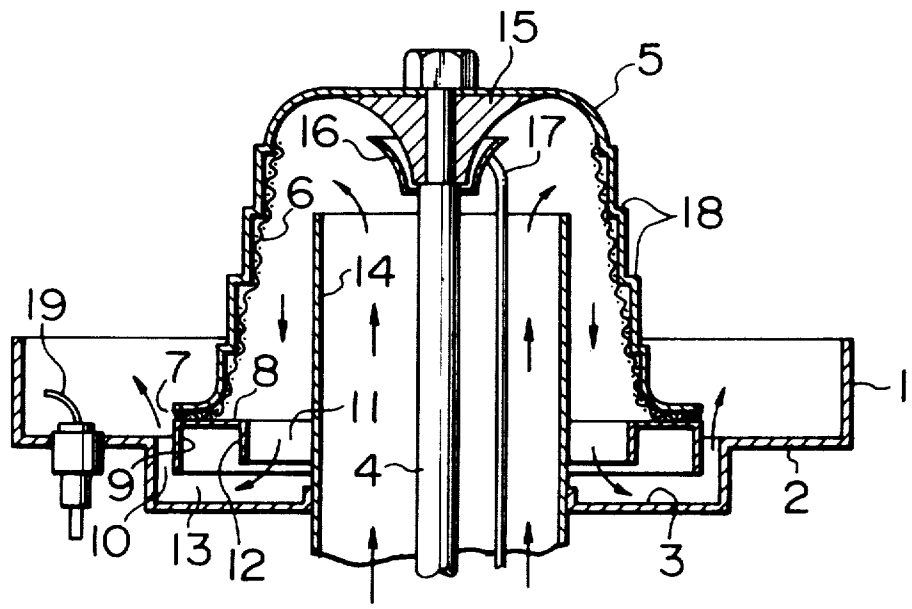


FIG. 1

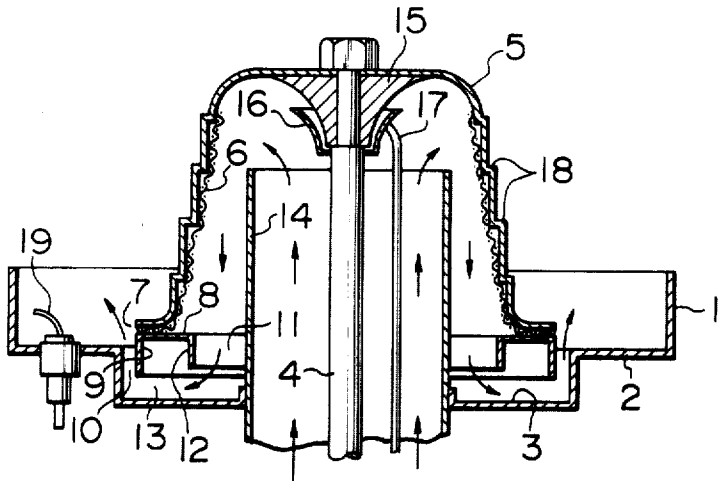


FIG. 2

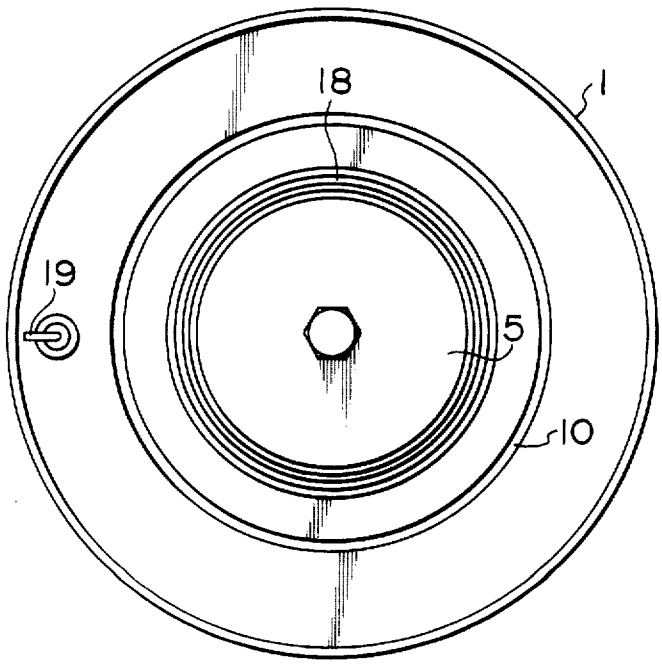


FIG. 3

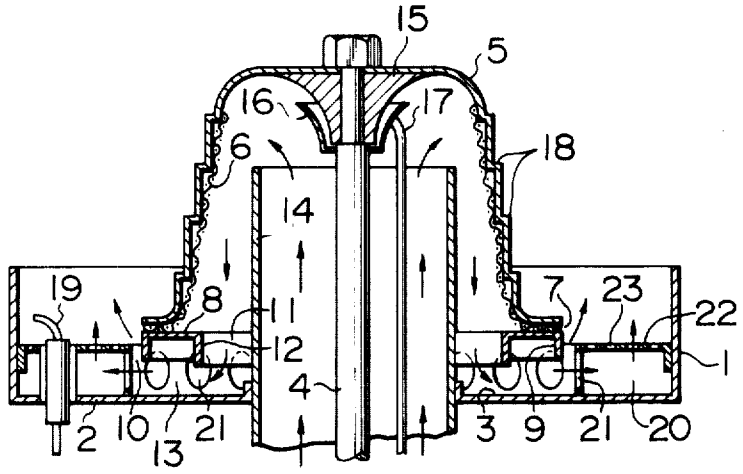


FIG. 4

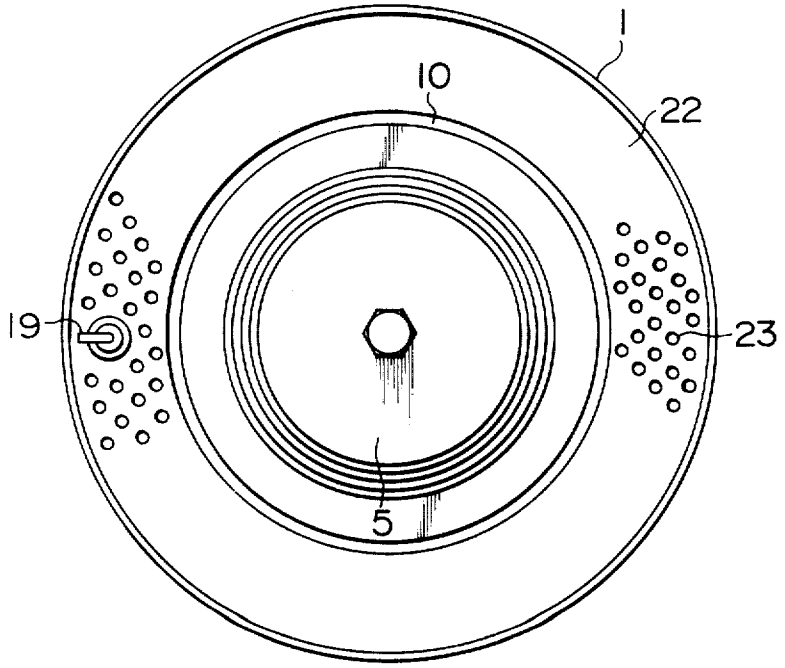


FIG. 5

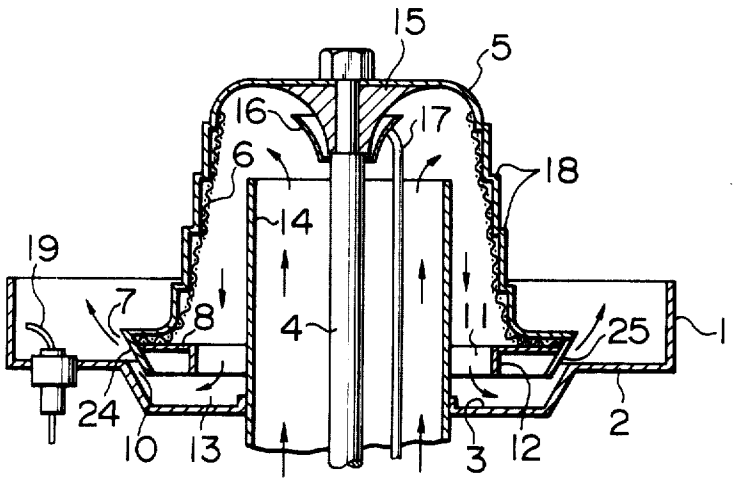


FIG. 6

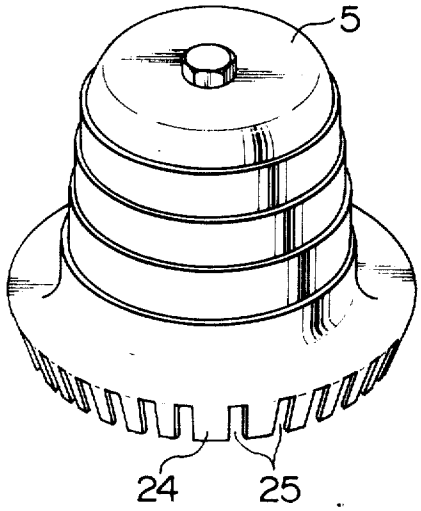


FIG. 7

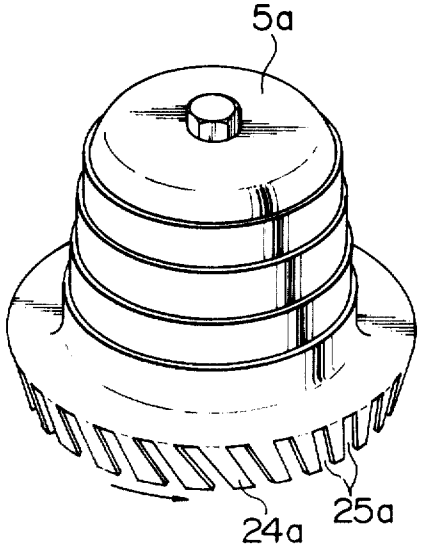


FIG. 8

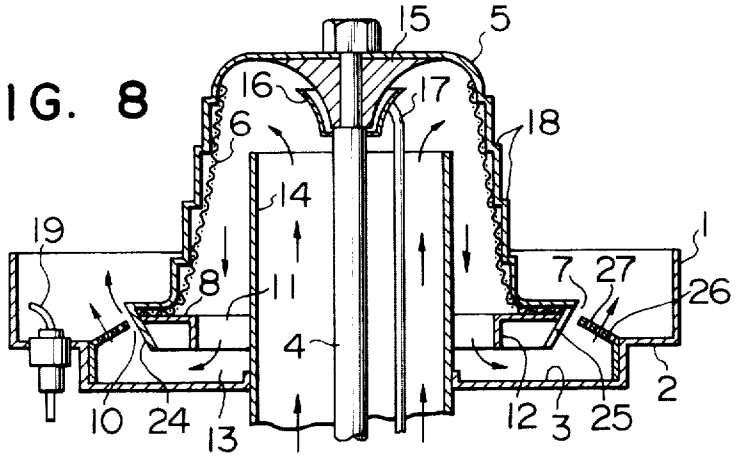


FIG. 9

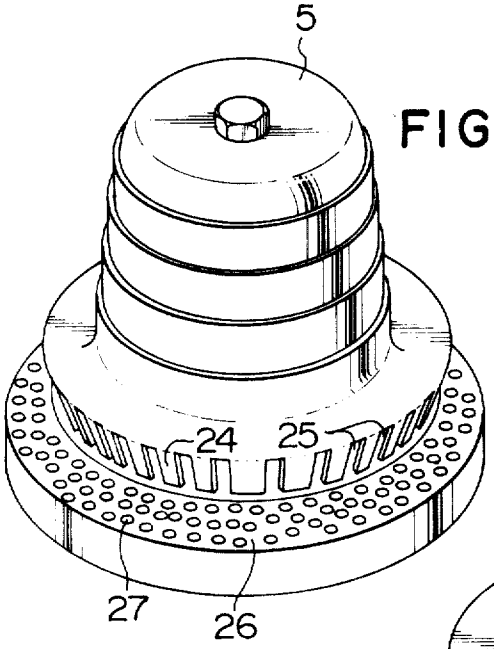


FIG. 10

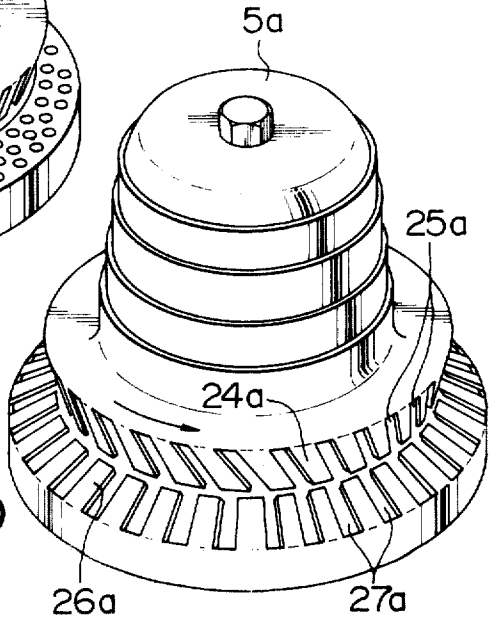


FIG. 11

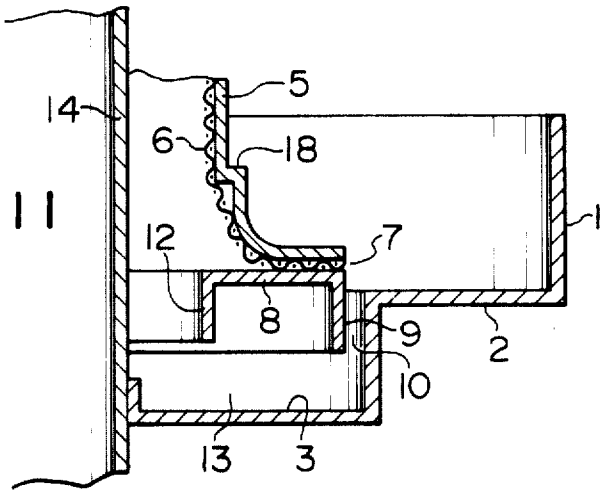


FIG. 12

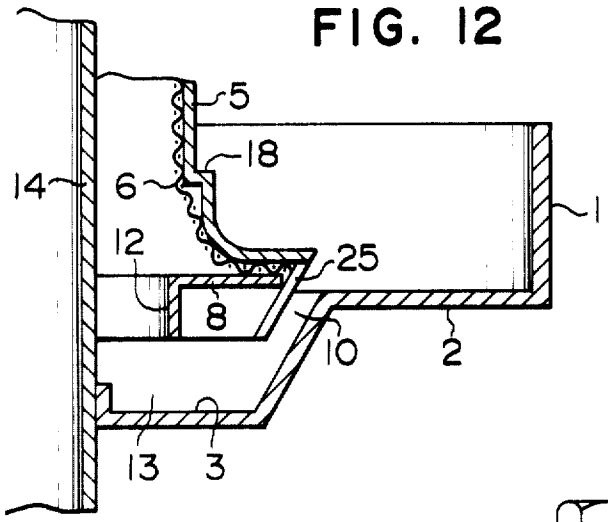
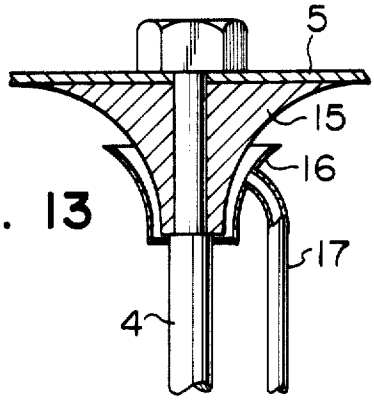


FIG. 13



LIQUID FUEL BURNER FOR BURNING LIQUID FUEL IN GASIFIED FORM

This invention relates to a novel, useful and improved liquid fuel burner which burns liquid fuel, particularly kerosene and the like, by gasifying the same and which ensures perfect combustion of the liquid fuel in gasified form.

I have previously developed a burner for burning liquid fuel by gasifying the same in which the liquid fuel supplied to the rotating fuel gasifying member is caused, by centrifugal forces and a stream of air under pressure, to diffuse and move along the inner surface of the wall of the fuel gasifying member and then to scatter, through the scattering gap formed at one end of the fuel gasifying member, into the main body of the burner in atomized particles to initiate combustion of the atomized liquid fuel. Then, the rotating fuel gasifying member is heated by the heating action of the flames produced by combustion of the atomized liquid fuel so as quickly to vaporize and gasify the diffusing and moving liquid fuel in the fuel gasifying member and to mix the produced gasified fuel with the stream of air under pressure, whereby the mixture of gasified fuel and air can be blown out through the gasified fuel blowing openings formed in the combustion plate cooperating with the inner periphery of the main body of the burner to define a gas chamber therebetween so as to sustain combustion of the gasified fuel for a long time.

In the burner of the aforementioned type, the gasified fuel produced in the fuel gasifying member is blown against the outer periphery of the fuel gasifying member through the multitude of gasified fuel blowing openings formed in the combustion plate cooperating with the inner periphery of the main body of the burner to define therebetween the gas chamber. This type of burner has the disadvantages of being unable to simplify the construction and to obtain a compact overall size in a burner. This invention provides improvements in the burner of the type described, so that the number of its component parts can be minimized, its construction can be simplified, and its size can be reduced while the burner can be fabricated by using thin sheet iron and the like.

Accordingly, a main object of this invention is to provide a liquid fuel burner for burning liquid fuel in gasified form which ensures that the gasified fuel produced in the rotating fuel gasifying member is positively mixed with a stream of air supplied under pressure into the fuel gasifying member and the mixture is thoroughly agitated so as quickly to produce a perfect mixture of gasified fuel and air, and which is capable of scattering atomized liquid fuel over a larger area than has been possible in the prior art when combustion of the atomized liquid fuel is initiated, so that initiation of combustion of the atomized liquid fuel can be facilitated.

Another object of the invention is to provide a liquid fuel burner for burning fuel in gasified form in which the gasified fuel produced by the heating action of the flames produced by combustion of the atomized liquid fuel is made to mix with a stream of air under pressure while taking a tortuous course along the gasified fuel-air mixing member mounted at the open end portion of the fuel gasifying member whereby a perfect mixture of gasified fuel and air can be produced.

Another object of the invention is to provide a liquid fuel burner for burning liquid fuel in gasified form in which the mixture of gasified fuel and air produced in the gasified fuel-air mixing member is first introduced under pressure into a gasified fuel-air mixture storing chamber defined between the recess formed in the main body of the burner and the gasified fuel-air mixing member and then blown out through the gasified fuel blowing passageway under a constant pressure along the outer periphery of the fuel gasifying member, so that combustion of the mixture of gasified fuel and air can be sustained.

Another object of the invention is to provide a liquid fuel burner for burning liquid fuel in gasified form in which a portion of the mixture of gasified fuel and air blown out of the gasified fuel-air mixture storing chamber and burning in flames is introduced into a gas chamber provided on the marginal portion of the bottom wall of the main body of the burner, so that the mixture of gasified fuel and air can be blown out through the gasified fuel blowing openings and the flames of combustion can be produced on a larger scale than has hitherto been possible in the prior art.

Still another object of the invention is to provide a liquid fuel burner for burning liquid fuel in gasified form in which a gasified fuel blowing passageway is disposed parallel to the axis of the burner, so that the flames of combustion of the gasified fuel can be vigorously emitted and directed forwardly.

Still another object of the invention is to provide a liquid fuel burner for burning liquid fuel in gasified form in which a multitude of blowing openings are formed in the cylindrical member extended from the open end portion of the substantially frustoconical fuel gasifying member rotatably mounted in the main body of the burner, and in which the cylindrical member is inserted, up to its substantially middle portion, in the recess formed in the main body of the burner so as thereby to form a gasified fuel blowing passageway. By this arrangement, the liquid fuel diffusing and moving along the inner surface of the wall of the fuel gasifying member can be blown and scattered in atomized particles on a larger scale through the blowing openings into the main body of the burner to expedite initiation of ignition of the atomized liquid fuel, and at the same time the gasified fuel-air mixture produced can be blown out separately through the gasified fuel blowing passageway and the blowing openings on a large scale, so that the flames of combustion of the gasified fuel can be produced over a wide area and yet the force of flames can be reduced. Thus, damage to the fuel gasifying member and the main body due to combustion can be prevented even if they are made of thin sheet iron and the like, and combustion of the gasified fuel can be sustained for a long time.

A further object of the invention is to provide a liquid fuel burner for burning liquid fuel in gasified form in which a gasified fuel blowing and burning body formed therein with a multitude of blowing openings is mounted on the marginal portion of the recess formed in the main body in which is mounted the cylindrical member formed therein with a multitude of blowing openings, so as to define a gasified fuel blowing passageway between the cylindrical member and the gasified fuel blowing and burning member. By this arrangement, combustion of the gasified fuel can produce flames arranged in double ring form consisting of

main flames produced by combustion of the gasified fuel blown out through the blowing openings and the gasified fuel blowing passageway and auxiliary flames produced by combustion of the gasified fuel blown out through the blowing openings formed in the gasified fuel blowing and burning body, so that the gasified fuel can burn in perfect combustion. Moreover, the area in which the flames are produced is increased, the force of the flames is reduced, and the liquid fuel tending to remain on the bottom wall of the main body of the burner at the time of combustinn of the liquid fuel in atomized particles or in gasified form can be vaporized and gasified by the heat of combustion of the gasified fuel blown out in flames through the blowing openings formed in the gasified fuel blowing and burning body.

Additional and other objects and features of the invention will become evident from the description set forth hereinafter when considered in conjunction with the accompanying drawings, in which:

FIG. **1** is a sectional front view, with certain parts being cut out, of the basic form of the liquid fuel burner burning liquid fuel in gasified form according to the invention;

FIG. **2** is a top plan view of the burner shown in FIG. **1**;

FIG. **3** is a sectional front view, with certain parts being cut out, of another embodiment of the liquid fuel burner according to the invention;

FIG. **4** is a top plan view of the burner shown in FIG. **3**;

FIG, **5** is a sectional front view, with certain parts being cut out, of another embodiment of the liquid fuel burner according to the invention;

FIG. **6** is a perspective view of the fuel gasifying member;

FIG. **7** is a perspective view of another form of fuel gasifying member;

FIG. **8** is a sectional front view, with certain parts being cut out, of another embodiment of the liquid fuel burner according to the invention;

FIG. **9** is a perspective view of the essential portions, with certain parts being cut out, in which the blowing openings formed in the cylindrical member extended from the open end portion of the fuel gasifying member are each defined by straight lines and the gasified fuel blowing and burning body is made of a plate with holes punched therein;

FIG. **10** is a perspective view of the essential portions, with certain parts being cut out, in which the blowing openings formed in the cylindrical member extended from the open end portion of the fuel gasifying member are each defined by straight lines forming an angle of advance with respect to the direction of rotation of the fuel gasifying member and the blowing openings formed in the gasified fuel blowing and burning body are each defined by stright lines;

Flg. **11** is a fragmentary vertical sectional front view, on an enlarged scale, of the essential portions at one side of the open end portion of the fuel gasifying member shown in FIG. **1**, with certain parts being cut out;

FIG. **12** is a fragmentary sectional front view, on an enlarged scale, of the essential portions at one side of the open end portion of the fuel gasifying member shown in Flg. **5**, with certain parts being cut out; and

FIG. **13** is a vertical sectional view, on an enlarged scale, of the fuel supply member and the parts associated therewith.

Embodiments of the invention will now be described with reference to the accompanying drawings, in which like reference characters designate similar parts in all the drawings. **1** is a main body open at one end and including a bottom wall **2** formed therein with a recess **3**. A hollow substantially frusto-conical fuel gasifying member **5** supported by a rotary shaft **4** extending through the substantially central portion of the main body **1** has an open end portion which is disposed in spaced juxtaposed relation to the recess **3**. As shown in detail in FIG. **11**, a gasified fuel-air mixing member **8** is joined, as by spot welding performed at suitable intervals, to the open end portion of the fuel gasifying member **5** through a flow-down preventing member **6** in the form of a wire net mounted on the inner surface of the wall of the fuel gasifying member **5**, so as to define a scattering gap **7** between the fuel gasifying member **5** and the gasified fuel-air mixing member **8** through the flow-down preventing member **6**.

As shown in FIG. **1**, the gasified fuel-air mixing member **8** is in the form of a cylinder open at one end, and its open end portion extends into the recess **3** formed in the main body **1** in such a manner that the scattering gap **7** is disposed slightly above the bottom wall **2** and an annular gasified air blowing passageway **10** is formed between a peripheral wall **9** of the gasified fuel-air mixing member **8** and the recess **3** formed in the bottom wall **2**. A guide wall **12** is mounted in the gasified fuel-air mixing member **8** and disposed in the open end portion of the fuel gasifying member **5** to form a gasified fuel passageway **11**. The gasified fuel-air mixing member **8** has an open end which is disposed in spaced juxtaposed relation to the recess **3**, so that a gasified fuel-air mixture storing chamber **13** is defined between the open end of the gasified fuel-air mixing member **8** and the recess **3**.

14 Designates an air supply duct extending through the main body **1** and the gas passageway **11** deep into the fuel gasifying member **5** to supply an air stream under pressure into the interior of the fuel gasifying member **5**.

15 is a fuel diffusing member of conical shape mounted at the forward end of the rotary shaft **4** and connected to the inner surface of the substantially central portion of the closed end of the fuel gasifying member **5**. The fuel diffusing member **15** is provided, as shown in detail in FIG. **13**, with a hollow conical fuel supply member **16** mounted on its outer periphery. The fuel supply member **16** has a forward end portion which diverges at a larger angle than the angle at which the forward end portion of the fuel diffusing member **15** diverges, and has a suitable fuel leak preventing member attached to its base to prevent liquid fuel from leaking and moving toward the rotary shaft **4**. A fuel supply line **17** is connected at its front end to the fuel supply member **16** which is maintained in the aforesaid position by virtue of its being supported by the fuel supply line **17**.

In the embodiment shown and described, the fuel gasifying member **5** is formed on its wall with a plurality of liquid fuel diffusion promoting offset portions **18** for promoting diffusion of the liquid fuel along the inner surface of the wall of the fuel gasifying member **5**. In the present invention, however, such offset portions **18** are not essential and may be dispensed with. **19** is an ignition plug having a forward end which is disposed near the main body **1** of the burner and at a level sub-

stantially similar to the level of the scattering gap **7**. Upon actuation of the ignition plug **19**, combustion of the liquid fuel in atomized particles and combustion of the liquid fuel in gasified form can be initiated.

The aforementioned statement refers to the basic form of liquid fuel burner for burning liquid fuel in gasified form as shown in FIG. **1** and FIG. **2**. FIG. **3** and FIG. **4** show another embodiment of the invention which can be used as a useful heating device wherein the liquid fuel in gasified form is emitted through the entire surface of the main body of the burner and burns in flames.

In the basic form of liquid fuel burner burning liquid fuel in gasified form as shown in FIG. **1** and FIG. **2**, the gasified fuel-air mixture storing chamber **13** is defined between the gasified fuel-air mixing member **8** and the recess **3**. The gasified fuel produced in the fuel gasifying member **5** is mixed with a stream of air under pressure in the gasified fuel-air mixing member **8** to produce a perfect mixture of gasified fuel and air, which is emitted vigorously through the annular gasified fuel blowing passageway **10** defined between the peripheral wall **9** of the gasified fuel-air mixing member **8** and the recess **3**, whereby combustion of the gasified fuel in blue flames arranged annularly can be sustained for a long time.

On the other hand, in the embodiment shown in FIG. **3** and FIG. **4**, a gas chamber **20** is provided on the marginal portion of the bottom wall **2** of the main body **1** to surround the gasified fuel-air mixture storing chamber **13**, and maintained in communication with the gasified fuel-air mixture storing chamber **13** through gas holes **21**. The gas chamber **20** is covered with a combustion plate **22** formed therein with a suitable number of gasified fuel blowing openings **23**. By this arrangement, the mixture of gasified fuel and air introduced under pressure into the gasified fuel-air mixture storing chamber **13** can be emitted through the gasified fuel blowing passageway **10** to sustain combustion of the gasified fuel, and part of the mixture of gasified fuel and air is introduced into the gas chamber **20** from the gasified fuel-air mixture storing chamber **13** to be emitted through the gasified fuel blowing openings **23** in the combustion plate **22** to sustain combustion of the gasified fuel after being emitted therethrough.

The liquid fuel burner shown in FIG. **3** and FIG. **4** which is provided with the aforementioned mechanism can function as an effective gasified liquid fuel burner device because the mixture of gasified fuel and air produced therein can burn in flames of combustion of the gasified fuel emitted through all the regions of the main body **1** of the burner.

FIG. **5** to FIG. **7** show a third embodiment of the invention in which the liquid fuel scattered in atomized particles from the fuel gasifying member **5** into the main body **1** of the burner does not scatter in a layer of small thickness as is the case when the atomized liquid fuel is scattered through the scattering gap **7** of the conventional type, but scatters in a layer of substantial thickness to enable combustion of the atomized liquid fuel to be initiated with a small volume of fuel. Besides, the mixture of gasified fuel and air produced is emitted in flames not only through the gasified fuel blowing passageway **10** but also through the blowing openings **25** formed in the periphery of the open end portion of the fuel gasifying member **5**. Thus, the area in which flames are produced by combustion of the gasified fuel can be increased and yet the force of the flames can be reduced. This permits to obtain a liquid fuel burner for burning liquid fuel in gasified form in which combustion of the liquid fuel in gasified form can be sustained for a long time without damaging the main body **1** and fuel gasifying member **5** by combustion, even if they are made of thin sheet iron and the like.

More specifically, the third embodiment shown in FIG. **5** to FIG. **7** is distinguished from the embodiment shown in FIG. **1** and FIG. **2** in that the recess **3** of the former is of an inverted frusto-conical shape and that the fuel gasifying member **5** of the former differs from that of the latter in construction for scattering atomized liquid fuel or producing gasified fuel. In the embodiment shown in FIG. **5** to FIG. **7**, a cylindrical member **24** having an angle complementary to that of the recess **3** is extended from the open end portion of the fuel gasifying member **5** such that it tilts inwardly. The cylindrical member **24** is formed in its periphery with a suitable number of blowing openings **25** arranged at intervals. The blowing openings **25** may be each defined by straight lines as shown in FIG. **6** or by inclined lines forming an angle of advance on the open end side of the fuel gasifying member **5a** with respect to the direction of rotation thereof as shown at **25a** to provide a cylindrical member **24a**.

Referring to FIG. **12**, the gasified fuel-air mixing member **8** is joined, through the flow-down preventing member **6**, by spot welding performed at suitable intervals to the open end portion of the fuel gasifying member **5**. The gasified fuel-air mixing member **8** is disposed within the fuel gasifying member **5** and in the neighborhood of the upper end of each blowing opening **25** and the fasified fuel-air mixture storing chamber **13** is defined between the gasified fuel-air mixing member **8** and the recess **3**. Thus, in the fuel burner shown in FIG. **5** to FIG. **7**, the liquid fuel diffusing and moving along the inner surface of the wall of the fuel gasifying member **5** is caused to scatter in atomized particles by centrifugal forces into the main body **1** of the burner not only through the scattering gap **7** described with reference to the first embodiment but also through the blowing openings **25** formed in the inwardly inclined periphery of the cylindrical member **24**, so that the atomized liquid fuel can scatter over a larger area. This facilitates initiation of combustion of the liquid fuel in atomized particles when the ignition plug **19** is actuated.

Following initiation of combustion of the atomized liquid fuel, the gasified fuel produced in the fuel gasifying member **5** is mixed with the stream of air under pressure and the mixture is agitated in the gasified fuel-air mixing member **8**. The mixture of gasified fuel and air thus produced is blown boliquely outwardly through the gasified fuel blowing passageway **10** defined between the recess **3** and the cylindrical member **24** so that it burns in gasified form, and part of the mixture of gasified fuel and air is blown out radially through the blowing openings **25** toward the peripheral wall of the main body **1** to burn in gasified form. The gasified fuel emitted radially through the blowing openings **25** burns in flames of low force, so that non-vaporized fuel on the bottom wall **2** can be quickly gasified and damage by combustion to the main body **1** and fuel gasifying member **5** can be prevented even if they are made of thin sheet iron or the like.

FIG. 8 to FIG. 10 show a fourth embodiment which can achieve better results than the third embodiment. In the embodiment shown in FIG. 8 to FIG. 10, a gasified fuel blowing and burning body 26 made of a plate formed therein with a multitude of blowing openings 27 as by punching as shown in FIG. 9 is mounted and disposed in an inwardly inclined position in the open end portion of the recess 3 in which the cylindrical member 24 described with reference to the third embodiment is inserted up to its substantially middle portion. Same as the case of the third embodiment, the gasified fuel-air mixture storing chamber 13 is defined between the gasified fuel-air mixing member 8 which is provided to the open end portion of the fuel gasifying member 5 and the recess 3. Thus, the gasified fuel blowing passageway 10 is defined between the gasified fuel blowing and burning body 26 and the cylindrical member 24 in this embodiment.

In the liquid fuel burner shown in FIG. 8 to FIG. 10, atomized liquid fuel is caused to scatter in a layer of substantial thickness into the main body 1 of the burner through the blowing openings 25 as is the case with the burner shown in FIG. 5 to FIG. 7 in initiating combustion of the atomized liquid fuel. Moreover, the mixture of gasified fuel and air produced in the fuel gasifying member 5 is blown out not only through the gasified fuel blowing passageway 10 and blowing openings 25 to burn but also through the blowing openings 27 formed in the gasified fuel blowing and burning body 26 to burn. The flames produced by combustion of the gasified fuel are lower in force in the burner of the fourth embodiment than in that of the third embodiment, thereby enabling more effectively to prevent damage by combustion to the main body 1 and fuel gasifying member 5.

In this embodiment, the gasified fuel emitted through the gasified fuel blowing passageway 10 and blowing openings 25 burns and forms an inner ring of flames, and the gasified fuel emitted through the blowing openings 27 in the gasified fuel blowing and burning body 26 burns and forms an outer ring of flames. Thus, the gasified fuel produces flames arranged in a double ring when combustion thereof is sustained, and perfect combustion of the gasified fuel can take place. Moreover, even if non-gasified fuel is produced and remains on the bottom wall 2 while combustion is in progress, the non-gasified fuel is immediately vaporized and burned in gasified form by the flames of combustion of the gasified fuel emitted through the blowing openings 27 formed in the gasified fuel blowing and burning body 26. It is to be understood that the invention is not limited to the use of a plate with holes formed therein by punching for forming the gasified fuel blowing and burning body 26, and that the gasified fuel blowing and burning body 26a may be formed, in place of blowing openings 27 formed by punching, with blowing openings 27a each defined by vertical straight lines as shown at 27a in FIG. 10.

In operation, the rotary shaft 4 is rotated with all the parts being in the positions shown in FIG. 1 and FIG. 2, to start the operation of the fuel gasifying member 5. At the same time, a stream of air is supplied under pressure through the air supply duct 14 into the interior of the fuel gasifying member 5. Then, liquid fuel is supplied through the fuel supply line 17 to the fuel supply member 16 fixed in place by the fuel supply line 17. The liquid fuel supplied in this way first moves downwardly into the fuel supply member 16 and then made to diffuse and move along the surface of the diffusing member 15 which is rotating till the liquid fuel shifts to the inner surface of the wall of the fuel gasifying member 5.

While moving along the inner surface of the wall of the fuel gasifying member 5, it forms a thin film on the wall of the member 5 and scatters in atomized particles toward the inner surface of the main body 1 of the burner through the scattering gap 7, together with part of the air previously supplied under pressure into the member 5. The atomized liquid fuel and air thus scattering through the gap 7 is ignited by means of the ignition plug 19 and combustion of the atomized liquid fuel is initiated. Part of the air supplied previously under pressure to the member 5 is introduced into the gasified fuel-air mixture storing chamber 13 and emitted vigorously through the gasified fuel blowing passageway 10, thereby promoting combustion of the atomized liquid fuel. The fuel gasifying member 5 is enveloped by the flames produced by combustion of the atomized liquid fuel and heated thereby, so that the temperature in the interior of the member 5 is raised to a gasifying atmosphere level.

Thereafter, the liquid fuel supplied to the fuel gasifying member 5 through the fuel diffusing member 15 is quickly vaporized and gasified by the heating action of the flames of combustion of the atomized liquid fuel, the blowing action of the stream of air supplied under pressure to the member 5 and the flow-down preventing and diffusing action of the flow-down preventing member 6 as the liquid fuel moves along the inner surface of the wall of the fuel gasifying member 5. At the same time, the air supplied to the fuel gasifying member 5 is heated into a hot blast, and the gasified fuel and hot blast are mixed together and agitated into a perfect mixture of gasified fuel and air as they take a tortuous course in moving along the gasified fuel-air mixing member 8 and pass through the gasified fuel passageway 11 till the mixture of gasified fuel and air is introduced under pressure into the gasified fuel-air mixture storing chamber 13.

In this way, the gasified fuel-air mixture storing chamber 13 is filled with the mixture of gasified fuel and air supplied thereinto under pressure, so that the mixture of gasified fuel and air is vigorously blown forwarly through the gasified fuel blowing passageway 10 into the main body 1 where the mixture is ignited by the flames previously produced by combustion of the atomized liquid fuel, whereby the state of combustion of liquid fuel in atomized particles can be automatically shifted to the state of combustion of gasified fuel. Since the gasified fuel forms a perfect mixture with air, the flames produced by combustion of the gasified fuel are blue flames and combustion of the gasified fuel can be sustained for a long time.

From the foregoing description, it will be appreciated that, in the fuel burner constructed as aforementioned according to the invention, the liquid fuel is first made to diffuse and move along the inner surface of the wall of the fuel gasifying member 5 by centrifugal forces produced by rotation of the fuel gasifying member 5 and by the blowing action of the air stream under pressure, and converted into atomized particles which are scattered into the main body 1 through the scattering gap 7 so as to initiate combustion of the atomized liquid fuel. Thereafter, the liquid fuel supplied to the fuel gas-

ifying member **5** can be quickly vaporized into a gasified fuel while diffusing and moving along the inner surface of the wall thereof, because the fuel gasifying member **5** is heated by the flames of combustion of the atomized liquid fuel and the air supplied thereto is converted into a hot blast. Moreover, the gasified fuel produced in this way takes a tortuous course along the gasified fuel-air mixing member **8** while moving from the fuel gasifying member **5** to the gasified fuel-air mixture storing chamber **13,** so that the gasified fuel is mixed well with the stream of air under pressure and formed into a perfect mixture of gasified fuel and air when it is supplied under constant pressure to the gasified fuel-air mixture storing chamber **13.** The mixture of gasified fuel and air introduced into the gasified fuel-air mixture storing chamber **13** can be vigorously blown out through the gasified fuel blowing passageway **10** and burn in blue flames.

It should be noted that the provision of the gasified fuel-air mixing member **8** has the effect of causing the gasified fuel produced in the fuel gasifying member **5** to slow down slightly in its movement toward the gasified fuel-air mixture storing chamber **13** and mixing the same well with the stream of air under pressure as its rate of movement is reduced while taking a tortuous course, so that a perfect mixture of gasified fuel and air can be produced. This prevents the production of red flames, thereby preventing the fuel gasifying member **5** from damage by combustion and ensuring sustained combustion of the gasified fuel in blue flames. In addition, part of the mixture of gasified fuel and air supplied under pressure to the gasified fuel-air mixture storing chamber **13** can be introduced into the gas chamber **20** so as to enable the flames of combustion of the gasified fuel to be produced on a large scale. At the same time, the mixture of gasified fuel and air of large volume can be ejected upwardly to a high level through the gasified fuel blowing passageway **10,** so that the flames of combustion of the gasified fuel can completely envelope the fuel gasifying member **5.** Thus, the fuel gasifying member **5** can be heated with a high degree of efficiency.

It should also be noted that, in the liquid fuel burner according to the invention, the cylindrical member **24** formed therein with a multitude of blowing openings **25** may be extended from the open end portion of the rotating fuel gasifying member **5** as a solid, with the cylindrical member **24** being inserted, up to its substantially middle portion, in the recess **3** so as thereby to provide the gasified fuel blowing passageway **10.** By this arrangement, atomized liquid fuel can be scattered in a layer of substantial thickness through the blowing openings **25** and spread over a large area within the main body **1** of the burner, thereby enabling combustion of the atomized liquid fuel to be initiated quickly and positively. At the same time, the flames of combustion of a mixture of gasified fuel and air can be reduced in force because the mixture is blown out through the gasified fuel blowing passageway **10** and the blowing openings **25** in a layer of substantial thickness. This is conductive to the prevention of damage by combustion to the main body **1** of the burner as well as the fuel gasifying member **5.**

According to the invention, the force of the flames of combustion can be further reduced and non-vaporization of the liquid fuel can be prevented by providing the gasified fuel blowing and burning body **26,** thereby enabling combustion of the gasified fuel in blue flames to be sustained for a long time.

I claim:

1. A liquid fuel burner for burning liquid fuel in gasified form comprising a main body formed with a recess in its bottom wall, a fuel gasifying member rotatably disposed in said main body, a gasified fuel-air mixing member mounted at the open end portion of said fuel gasifying member as a unit therewith, a scattering gap defined between said fuel gasifying member and said gasified fuel-air mixing member, said gasified fuel-air mixing member being inserted in said recess such that a gasified fuel blowing passageway is defined between said gasified fuel-air mixing member and said recess and a gasified fuel-air mixture storing chamber is formed by said recess and said gasified fuel-air mixing member, and an air supply duct having a forward end portion inserted in said fuel gasifying member.

2. A liquid fuel burner for burning liquid fuel in gasified form comprising a main body including a bottom wall, a gas chamber disposed on the marginal portion of said bottom wall, a gasified fuel-air mixture storing chamber disposed inwardly of said gas chamber and maintained in communication therewith, a fuel gasifying member rotatably disposed in said main body, a gasified fuel-air mixing member mounted at the open end portion of said fuel gasifying member as a unit therewith, a scattering gap defined between said fuel gasifying member and said gasified fuel-air mixing member, said gasified fuel-air mixing member being inserted in said gasified fuel-air mixture storing chamber so as to define a gasified fuel blowing passageway between said gas chamber and said gasified fuel-air mixing member, said gas chamber being maintained in communication with said fuel gasifying member, and an air supply duct having a forward end portion inserted in said fuel gasifying member.

3. A liquid fuel burning for burning liquid fuel in gasified form comprising a main body formed with a recess in its bottom wall, a fuel gasifying member directly connected to a rotary shaft inserted in said main body, a gasified fuel-air mixing member disposed within the open end portion of said gasifying member, a scattering gap defined between said fuel gasifying member and said gasified fuel-air mixing member, a cylindrical member extended from the open end portion of said fuel gasifying member as a solid and formed therein with a multitude of blowing openings, said cylindrical member being inserted in said recess up to its substantially middle portion to define a gasified fuel blowing passageway between said cylindrical member and said recess, a gasified fuel-air mixture storing chamber is formed by said recess and said gasified fuel-air mixing member, and an air supply duct having an opening therein and inserted in said fuel gasifying member.

4. A liquid fuel burner for burning liquid fuel in gasified form comprising a main body formed therein with a recess, a fuel gasifying member directly connected to a rotary shaft inserted in said main body, a gasified fuel-air mixing member disposed within the open end portion of said fuel gasifying member, a scattering gap defined between said fuel gasifying member and said gasified fuel-air mixing member; a cylindrical member extended from the open end portion of said fuel gasifying member as a solid and formed therein with a multitude of blowing openings, a gasified fuel blowing and burning body disposed on the marginal portion of said re-

cess and formed therein with a multitude of blowing openings, said cylindrical member being inserted in said recess up to its substantially middle portion to define a gasified fuel blowing passageway between said gasified fuel blowing and burning body and said cylindrical member, a gasified fuel-air mixture storing chamber is formed by said recess and said gasified fuel-air mixing member, and an air supply duct having an opening at a forward end portion inserted in said fuel gasifying member.

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