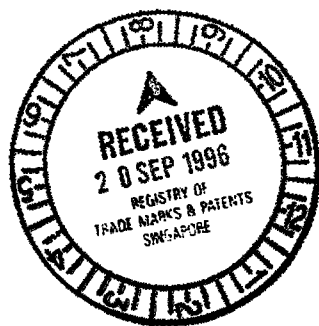


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GAS DELIVERY DEVICE AND BURNER ASSEMBLY

The invention is described in the following specification.



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GAS DELIVERY DEVICE AND BURNER ASSEMBLY

This invention relates generally to gas burners and more particularly to a device for delivering fuel gas to a burner assembly having a plurality of independently controllable burners, and to such a burner assembly. The invention is especially suited to gas cooktops or "hobs", stoves, cookers, etc. having a burner assembly with separate inner and outer burners which are independently supplied with fuel gas. Such burner assemblies are often referred to as "wok burners". It will be convenient to hereinafter describe the invention in relation to that example application but it should be understood that the invention is intended for more general application and use.

In simple wok burners, a single gas control cock and single venturi are used to supply a fuel gas mixture to both the inner and outer burners simultaneously. Both burners must therefore operate together. In superior wok burners, the inner and outer burners are supplied in such a way that the inner burner may be used alone or both burners may be used together. This arrangement is far more flexible, catering for any type of cooking from very low heat simmering to very high heat frying.

A burner assembly in a gas cooktop is generally carried by a "burner support" which is secured to the base of the cooktop enclosure. The burner support physically carries the burner assembly and delivers a fuel gas mixture to each of the burners in the assembly. The present invention is directed to the gas delivery function of the burner support. However it will be convenient to refer to the gas delivery device of the invention as a "burner support" because this is the term generally used by those skilled in the art. The burner support may also carry a spill tray for catching overflowing liquids and a support for a cooking utensil.

In order to achieve independent operation of inner and outer burners, prior art wok burners have employed two separate burner supports, one to deliver gas to the inner burner and another to deliver gas to the outer burner. This duplication of burner supports increases the manufacturing cost of the cooktop.

The two burner supports also require two apertures to be provided in the top plate of the cooktop or in the spill tray surrounding the burner assembly. The apertures are generally formed so as to leave as small a gap as possible around

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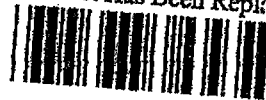
plurality of burners of a burner assembly.

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Preferably a gas inlet to the outer flow passage is provided through a wall of the body. This inlet may be connectable to a first controllable gas source. Advantageously the inner conduit passes through a wall of the body to form an inlet to the inner flow passage. This inlet may be connectable to a second
5 controllable gas source.

In an alternative embodiment of the invention the gas flow passages may be arranged in side by side relationship. The passages may be separated by partitions within the body and each flow passage may have an inlet located on the external wall of the body.

10 According to another aspect of the invention there is provided a burner assembly for use with the gas delivery device of the invention. The burner assembly includes a plurality of burners configured for independent delivery of fuel gas and includes means to engage the gas supply means of the gas delivery device such that each gas flow passage communicates with a respective burner.

15 Preferably the burner assembly has two burners consisting of an inner burner and an annular outer burner surrounding the inner burner. The inner burner is preferably adapted to receive fuel gas from a central flow passage within a coaxially arranged gas supply means. The outer burner is preferably adapted to receive fuel gas from an outer flow passage within the gas supply means.

20 To assist the further understanding of the invention, preferred embodiments will now be described in greater detail with reference to the accompanying drawings. It is to be appreciated that these embodiments are given by way of illustration only and the invention is not to be limited by this illustration. Throughout the following detailed description the term "burner
25 support" is used to refer to the device for delivering fuel gas to a burner assembly.

In the drawings:

Figure 1 shows an exploded perspective view of a typical prior art gas cooktop;

30 Figure 2 shows a cross-section of a prior art burner assembly and burner support in which a fuel gas mixture is simultaneously delivered to both an inner burner and an outer burner;

Figure 3 shows a cross-section of a prior art burner assembly and two burner supports delivering a fuel gas mixture to an inner and outer burner;

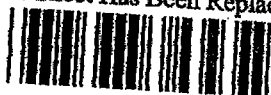


Figure 4 shows a cross-section of a burner support and burner assembly according to a preferred embodiment of the invention;

Figures 5A and 5B show a plan view and side elevation (partly in cross-section) respectively of an alternative embodiment of the burner support of the invention.

Figures 6A and 6B show a plan view and side elevation respectively of a further embodiment of the burner support of the invention.

Figures 7A and 7B show a plan view and side elevation respectively of a further embodiment of the burner support of the invention.

Figure 8 shows a side elevation (partly in cross-section) of a still further embodiment of the burner support of the invention.

Figure 1 of the drawings shows a typical prior art gas cooktop 10 having three burner assemblies 11 to 13. Burner assembly 11 is a wok type burner and includes a burner base 12, an inner burner 13 and an outer burner 14. The burner assembly 11 is carried by a burner support 15 mounted on the base 16 of the cooktop 10. The burner support 15 projects through an aperture 17 in the top plate 18. In the cooktop 10 shown, the inner burner 13 and outer burner 14 are supplied simultaneously with fuel gas from a single outlet gas cock 19 which is controlled by a control knob 20 on control panel 21. Fuel gas from the gas cock 19 is mixed with air at venturi 22 and the mixture is supplied to the burner support 15 for delivery to the burner assembly 11. For convenience of lighting the gas flame at the burner assembly 11 an ignition electrode 23 is typically provided. The electrode 23 projects through a small hole 24 in the top plate 18.

Figure 2 shows a typical prior art wok type burner assembly 11 and burner support 15, as may be used in the cooktop 10 of figure 1. As in figure 1, the burner assembly 11 includes a burner base 12, inner burner 13 and outer burner 14. The burner support 15 delivers gas from its inlet 30 to both the inner burner 13, via flow passages 31 and 32, and to the outer burner 14, via flow passages 31, 33 and 34. The gas then emerges from outlet ports 35 in inner burner 13 and from outlet ports 36A and 36B in outer burner 14. In the example shown in figure 2 a spill tray 37 is also provided.

Figure 3 shows a typical prior art wok type burner assembly 40 having independent supply of gas to inner and outer burners 41 and 42 respectively.



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Inner burner 41 is supplied by a burner support 43 and gas is delivered to the burner from the inlet 44 via flow passage 45. Outer burner 42 is supplied by a burner support 46 and gas is delivered to the burner from the inlet 47 via flow passage 48. The example shown in figure 3 includes a spill tray 49 located within the top plate 50 of the cooktop. It can be seen that both of the burner supports 43 and 46 pass through apertures in the spill tray 49. The respective apertures are made as small as possible so as to create as effective a seal as possible between the burner supports 43 and 46 and the spill tray 49. The possibility of liquid entering the cooktop enclosure is thereby reduced.

10 A recent development in gas cooktop design is to use toughened glass for the top plate. This material is far easier to clean than a traditional enamel finished steel top plate and, in many cases, this eliminates the need for separate spill trays. Glass top plates are generally formed as a flat sheet of toughened glass. Holes are provided through the glass for spill trays or, where no spill trays are used, for the burner supports. In the latter case, where spill trays are not used, two holes are needed to deliver gas to each burner assembly having independent inner and outer burners. A gas cooktop having three burner assemblies with independent inner and outer burners would thus require six holes to be provided in the top plate. This greater number of holes in the top plate increases the likelihood of liquids entering the cooktop enclosure, reduces the strength of the top plate and creates significant alignment problems during assembly of the cooktop.

Figure 4 shows a burner support 60 in combination with a burner assembly 61 according to an embodiment of the present invention. The burner assembly 61 includes a burner base 62, an inner burner 63 and an outer burner 64. The inner burner 63 includes a ring of outlet ports 65 and the outer burner 64 includes two rings of outlet ports 66A and 66B. The burner base 62 includes an inlet chamber 67, transfer duct 68 and annular channel 69 for distribution of a fuel gas mixture to the outlet ports 66A and 66B of the outer burner 64.

30 Burner support 60 includes a generally cylindrical body 70 having a mounting flange 71 for securing it to the base of a cooktop enclosure. The body 70 includes an inlet 72 for connection to a gas supply and includes an outlet 73 for delivering the gas to inlet chamber 67 of the burner base 62. That gas then



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flows to the outer burner 64. The upper end of the body 70 includes a radial shoulder 74 and neck 75 to engage the burner base 62. In the arrangement of Figure 4 the neck 75 of the body 70 projects through a hole 76 in a toughened glass hot plate 77 of the cooktop. The body 70 may however be positioned
5 higher within the cooktop enclosure such that a greater portion of the body 70 projects through the hole 76 in the top plate 77. Such an arrangement may assist alignment of the burner assembly 61 on the burner support 60.

Located within the body 70 of the burner support 60 is a conduit 80. This conduit 80 is configured at its upper end to engage the inner burner 63.
10 Advantageously the conduit 80 is coaxial within the cylindrical body 70. The lower end of the conduit 80 turns 90° and passes through a wall of the body 70 to an inlet 81 for connection to a second supply of gas.

The burner support of the invention thus independently delivers a fuel gas mixture to the inner burner 63 and to the outer burner 64. Each burner may thus
15 be operated and controlled independently of the other burner. The invention achieves this functionality within a single burner support body 70. This means that only one hole needs to be provided in the top plate 77 of the cooktop to carry and supply independent sources of gas to the burners within the burner assembly.

20 The burner support of the invention reduces the cost of producing a cooktop having burner assemblies with independent control of inner and outer burners. A single burner support according to the invention may be more cheaply manufactured than two of the prior art burner supports needed to achieve the same functionality. The fewer number of components also reduces the time
25 required to assemble a complete cooktop. Having fewer holes in the top plate reduces the number of elements which need to be aligned during assembly of the cooktop and this makes assembly of the cooktop much easier and hence faster and cheaper.

The reduced number of holes in the top plate also means that there is less
30 chance of liquids entering into the cooktop enclosure. In the case of toughened glass top plates, fewer holes result in greater strength of the top plate.

To allow electronic ignition of the gas flame the cooktop may be provided with ignition electrodes as shown in Figure 1. A safety sensor, often called a



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flame failure device, may also be provided. Clearly, these items must also project through the top plate of the cooktop and small access holes may be provided for this purpose. Because these holes are relatively small and adequate sealing may be fitted, they do not present significant liquid entry problems. Their small size
5 also means that they do not significantly effect the strength of a glass top plate.

Referring again to Figure 4, the gas inlets 72 and 81 leading to the outer and inner burners 64 and 63 respectively may each be connected to a venturi and gas cock in a manner similar to that described in relation to Figure 1. Two venturis may be arranged for operation by a single gas cock having two outlets if
10 desired. In one mode of operation, turning a control knob in one direction may operate both burners and turning the control knob in the other direction may operate only the inner burner. In an alternative mode of operation, the gas cock may be configured for rotation in one direction only, for example anti-clockwise. Turning the control knob to a first position may produce low flame from both the
15 inner and outer burners. Turning to a second position may produce high flame from both burners. Continuing to turn to knob in the same direction to a third position may extinguish the outer burner and leave a high flame at the inner burner only. Turning the knob to a final fourth position may reduce the flame at the inner burner to a low level while leaving the outer burner extinguished.

20 Figures 5 to 7 show modified forms of the burner support shown in Figure 4. Each includes a body 90 having a gas inlet 91, a flow passage 92 and an outlet 93 for delivering gas to one burner of a burner assembly. Each body 90 contains a conduit 94 having an inlet 95, accessible through a wall of the body 90, a flow passage 96 and an outlet 97 for delivering gas to a second burner of the
25 burner assembly. Figures 6 and 7 show embodiments where gas fittings of the same size may be used for both inlets 91 and 95. Figure 7 also shows the inlet 95 being screw fixed to the body 90. Other alternatives may be by welding, soldering or integral casting as a single piece.

Figure 8 shows an alternative embodiment of the burner support of the
30 invention. The support includes a body 100 having a gas inlet 101, a flow passage 102 and an outlet 103 for delivering gas to a first burner of a burner assembly. The body 100 includes a partition 104 separating a portion of the interior of the body 100 to form a second flow passage 105. The second flow

passage 105 includes an inlet 106, passing through a wall of the body 100, and an outlet 107 for delivering gas to a second burner of the burner assembly.

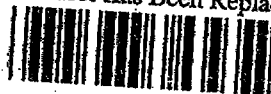
5 It can be seen that in all embodiments of the burner support according to the invention a single body delivers fuel gas independently to a number of burners in a burner assembly. Although only two burners have been described it is envisaged that three or more burners may be similarly independently supplied with a fuel gas mixture by a single burner support. The invention accordingly allows independent operation and control of any number of burners carried by the single burner support.

10 Although preferred embodiments of the invention are described herein in detail, it will be understood by those skilled in the art that various modifications may be made thereto without departing from the spirit of the invention or the scope of the appended claims.

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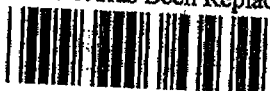
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1. A device for delivering fuel gas to a burner assembly, the assembly having a plurality of gas burners configured for independent delivery of fuel gas, the
5 device including a gas supply means having a plurality of gas flow passages, each passage communicating with a separate one of the plurality of burners and having a gas inlet which is separately accessible for connection to a controllable gas source.
2. A device according to claim 1, further including means for supporting the
10 burner assembly.
3. A device according to claim 2, wherein the gas supply means provides the means for supporting the burner assembly in the form of a single support.
4. A device according to claim 1, 2 or 3, wherein the gas supply means includes coaxial gas flow passages.
- 15 5. A device according to claim 1, 2 or 3, wherein the gas supply means includes two gas flow passages, each said passage being provided by a conduit wherein an inner conduit is arranged within an outer conduit to define an inner flow passage and an outer flow passage.
6. A device according to claim 5, the inner flow passage being configured for
20 delivery of gas to an inner burner of the burner assembly and the outer flow passage being configured for delivery of gas to an annular outer burner of the burner assembly.
7. A device according to claim 6, wherein the inner conduit extends beyond the outer conduit to connect the inner flow passage to the inner burner, the outer
25 flow passage being connected to the outer burner.
8. A device according to claim 5, 6 or 7, wherein the gas supply means is constituted by the two conduits.
9. A device according to any one of claims 5 to 8 when appended to claim 2 or 3, wherein the means for supporting the burner assembly is provided on the
30 outer conduit.
10. A device according to claim 1, 2 or 3, wherein the gas supply means includes gas flow passages arranged in side-by-side relationship.

11. A device according to claim 10, wherein the gas supply means is constituted by a body having internal partitions separating the body into said gas flow passages, each said passage having an inlet located on an external wall of the body.
- 5 12. A burner assembly for use with the device according to any one of claims 1 to 11, wherein the burner assembly includes a plurality of burners configured for independent delivery of fuel gas and wherein the assembly includes means to engage the gas supply means such that each said gas flow passage communicates with a respective burner.
- 10 13. A gas cooking appliance including a burner assembly according to claim 12 and a device for delivering fuel gas to the burner assembly according to any one of claims 1 to 11.
14. A device for delivering fuel gas to a burner assembly substantially as herein described with reference to Figures 4 to 8 of the accompanying drawings.
- 15 15. A burner assembly substantially as herein described with reference to Figure 4 of the accompanying drawings.

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