

Gas Stove Burner

Description

Objects of the Invention

The gas stove burner according to this invention is for the use in restaurants and households. It is the burner that uses gas as fuel.

FIG.1 illustrates a common burner, which comprises of a nozzle valve (1) that distributes gas through an air socket (2), with an adjusting knob (3) to trap the required amount of air. The gas then flows through a gas pipe (4) to a gas cylinder (5), which has a cover lid (6) placing on top. The cover lid (6) consists of a series of outer (7) and inner (8) gas holes that are used for igniting the combustion inside a stove frame (9), which preserves the heat as well as protects the combustion from external wind.

FIG.3 show components of the gas stove burner according to this invention. The objective of the invention is to improve the internal shapes of the gas pipe (4) and the cylinder (5) so that the flow of the gas stream exiting from the gas cylinder (10) is smooth and has as much uplift towards the cover lid (6) as possible. As a result, velocity of the gas flow at distributing holes (11) is higher. Another improvement is in the middle region of the gas cylinder (12) to allow oxygen underneath the burner to enter and help combustion of the flames in the middle more directly, thus producing more heat with less amount of gas.

The secondary objectives are to make the gas cylinder (5) removable from the stove frame (9) and able to balance itself on its own legs (44) (70), and to improve stability of the small stove frame (37) when placing on the gas cylinder (5) without having to connect it with a light-reflecting ring (38).

Another objective is to reduce the height of the burner to improve its use in narrow area (area with limited space such that the burner and the stove frame (9) cannot be inserted underneath a utensil).

Field of the Invention

Aerodynamic Engineering: in parts that are involved with the flow of the gas stream from the gas pipe to the gas cylinder. The flow is accelerated, smoothed, and redirected onto the end of the gas cylinder, before moving through the cover lid and reaching the gas holes.

Gas Stove-Related Engineering: in parts that are involved with transporting external cold air into the system to enhance combustion and reducing the height of the burner.

Background of the Invention

Some portions of the gas stove burner according to this invention have been developed and improved from sub patent no. **0503000070** and patent no. **107504**.

FIG. 1 and 2 demonstrate a typical high-pressure gas stove burner that consists of a gas pipe (4), with circular internal cross section and round internal surface, connected to a gas cylinder (5) which has void in the middle (13), thus appears similar to a doughnut from top view. The cylinder has flat bottom surface (14) and a hollow cylinder (15) inside which cause the flow of the gas stream (16) that exits from the gas pipe into the gas cylinder (5) to collide (17) with the hollow cylinder (15) before reaching a cover lid. The gas then travels over the flat surface until it reaches the rear portion of the hollow cylinder and eventually exits the holes all around the cylinder. As a result, the flow of the gas stream is turbulent, uncontrollable, and loses its velocity, which, consequently, causes the velocity of the gas at the distributing holes to be lower than what can be expected.

Boiling water in limited space into which is impossible to insert a burner and a stove frame causes most of users to remove the stove frame (9) resulting in combustion losing its temperature and being exposed to external wind. Therefore, this invention is aimed to improve the fuel consumption of the high-pressure gas stove burner and its use to be more effective even in area with limited space.

Brief Descriptions of the Drawing

FIG. 1 Common gas stove burner

FIG. 2 Cover lid and gas cylinder with some portion removed to illustrate flow of gas stream in gas cylinder and placement of gas cylinder on supporting structure of typical gas burner

FIG. 3 Components of gas stove burner according to this invention

FIG. 4 Cross section of gas cylinder according to this invention, viewing from gas pipe

FIG. 5 Cross section of gas cylinder according to this invention, side view

FIG. 6 Top view of gas cylinder according to this invention

FIG. 7 Cross section of gas cylinder according to this invention

FIG. 8 Cover lid and cross section of light-reflecting ring according to this invention

FIG. 9 Details inside cover lid according to this invention and gas flow

FIG. 10 Gas cylinder and cover lid according to this invention

FIG. 11 Gas stove burner according to this invention that can be used in limited space

Specific Description

FIG. 2 demonstrates details inside a common gas cylinder, which has characters similar to those previously mentioned in "History of Art and Related Subjects" topic.

FIG. 4 and 5 show details inside a gas pipe according to this invention, which is designed to have a specific character: a wedge (18) along the upper internal surface of the gas pipe. The size of the wedge is increased from small (19) to large (20), with its smaller side (18) pointing toward an air socket. The small end is increased until the wedge reaches the exit before the gas cylinder. Its purpose is to divide the flow of the gas stream (21) traveling from an injection through the air socket into two paths (22) (23) to avoid collision with a hollow cylinder (24) inside the gas cylinder. The gas flow is rendered smooth before entering the gas cylinder. This wedge also increases surface area inside the gas pipe; therefore it enhances the flow of the gas stream.

FIG. 4, 5, and 6 illustrate details inside the gas cylinder according to this invention, which has been developed from sub patent no. **0503000070** and patent no. **107504**.

Flow-splitting wedges (25) are extended to almost reach curved wedges (26) that encircle the flow of the gas stream (22) (23) exiting from the gas pipe. Additional specific character is that their top sharp portions, similar to a curved wedge when viewing from the side, are raised (27) and their bottom portions are slightly widened (28) to form two cup-like air rails (29) (30) on both sides of the hollow cylinder (24) inside the gas cylinder. These rails, with their entrances (31) greater in size than their exits (32), will increase the velocity of the flow; if their entrances (31) and exits (32) have similar sizes, the velocity will only be slightly different. The ends of the rails (32), which are curved upward in the vicinity before the rear of the hollow cylinder (24) due to the improvement of the curved wedges (26) by gradually elevating them (33) until the end of the gas cylinder on the opposite side of the gas pipe (34), will direct the flow of the gas stream (35) to inner and outer gas holes until the opposite side of the gas pipe. In addition, these cup-like rails (29) (30) will create uplift (36) for the flow of the gas stream that will bolster the flow to the cover lid throughout the rails resulting in the flow that exits the gas cylinder before entering the lid being smooth and directed towards the gas holes more efficiently.

FIG. 9 shows details inside the cover lid according to patent no. **107504**.

FIG. 10 demonstrates the assembly of the cover lid (6) and the gas cylinder (5). When they are assembled in the correct position, both wedges in the cover lid (39) and the gas cylinder (25) will be raised until they are in contact (40) to form four pathways (41) for gas flow, with two on the left side for inner and outer gas holes on the left; and two on the right side for inner and outer gas holes on the right. The flow of the gas stream, before reaching all the gas holes around, will have equal velocity, or faster velocity than that in the case of wedges in the cover lid (39) and wedges in the gas cylinder (25) not in contact.

FIG. 10 shows that the cover lid (6) and the gas cylinder (5) can be arranged to the correct position by the bolt (42) on the gas cylinder and the hole (43) in the cover lid. The bolt and the hole (42) (43) have suitable sizes and positions so that the cover lid (6) can be placed on the gas cylinder accordingly.

FIG. 8 illustrates details of the cover lid (6) which is designed with a curved rail (69). From a cross section, this rail is seen located between the outer (7) and the inner gas holes (8) to allow cold air underneath (71) to enter and help combustion.

FIG. 10 shows details in the middle of the gas cylinder according to this invention, which is designed such that it is closed (45) to prevent heat from circulating to the underside. In addition, there is a small tube (46) projecting upward to the vicinity where the tips of the flames (47) from inner holes connect. A common high-pressure stove burner is designed to have flames from inner gas holes inclined to connect and create a center of heat. Therefore, combustion in this high-temperature area needs oxygen to enhance efficiency; which means combustion will be as efficient as possible with cold air entering from underneath via this tube (46).

FIG. 1 and 2 demonstrate a common high-pressure gas stove burner, which has three legs (48) to insert bolts (50) into so that the burner can be connected to a supporting structure of the stove frame (49). The height of these legs, the thicknesses of this supporting structure (49) and bolts (50), including the space between the bolts and the floor (to prevent the bolts from touching the floor, thus easily become rusty), are two to three centimeters in total (51).

FIG. 3, 4, and 10 show details of the gas cylinder according to this invention, which is designed not to have any legs; instead it has outstretching wings (52) from its body and bolt holes (54) to tie the bolts with the supporting structure of the stove frame (53). The supporting structure is raised higher to carry these wings, with the bottommost portion of the gas cylinder almost touches the floor. The supporting structure has holes (55) for inserting bolts into so that the wings of the gas cylinder can be attached to it. This results in the high-pressure gas stove burner having smaller height than common burners. Therefore, it can be placed under any utensils that have limited space without having to remove the stove frame, which helps in storing heat and protecting combustion from external wind.

FIG. 10 illustrates legs (44) that are extended from the tips of the outstretching wings (52) and a wedge (70) that is projecting from underneath the gas pipe. These legs (44) (70) will support the gas cylinder and provide more stability to it so that the gas cylinder can stand independently without any extra tools. The heights of these legs are only long enough to lift the bottommost portion of the gas cylinder slightly above the floor, thus serving one purpose of this invention: reduce the height of the burner.

FIG. 3 shows a small stove frame (37) with inward curves (56) that fit completely with the width of the wings (52) of the gas cylinder. As a result, the small stove frame (37) can be placed on these wings that will prevent movement in counterclockwise or clockwise direction in the horizontal plane. The wings (52) of the gas cylinder also have wedges (57) on top surface that are aligned with the width of the inner diameter of the small stove frame (58). Hence, the small

stove frame (57), when placing on the wings (52), will not move in the horizontal plane (left, right, forward, backward, counterclockwise, clockwise), but it can be easily lifted.

FIG. 3 demonstrates the internal body of the small stove frame with vertical fins (59) arranged in spacing to help protect against wind coming from underneath.

At this point, the new invention is the high-pressure gas stove burner that has only the gas cylinder (5), the cover lid (6), the light-reflecting ring (38), and the small stove frame (37) that can be assembled with great stability, can be used in area with limited space, and can be detached very easily for cleaning up, as shown in FIG. 11.

FIG. 3 and 8 show the light-reflecting ring (38) in this invention, which has been developed from the light-reflecting ring in patent no. **107504**. The additional specific character is that its external surface (60) is elevated above its internal surface (61) to help protect the base of the outer flame from wind. The upper surface (62), which is a connecting seam of the external (60) and internal (61) surfaces, is curved similarly to a cup (62) so that steam or heat from the outer flames circulating via this curve (62) will raise to enhance the heat efficiency of the outer flames.

FIG. 3 illustrates the stove frame, according to this invention, that has a curved wedge (63), which is inclined outward (64) and slightly trimmed (65) on top until the outermost portion of the wedge (66), elevating from all around the edge of the stove frame (9). This wedge encircles flames while they travel along the bottom of a utensil, after colliding with it.

FIG. 3 shows a curved wedge (63) on the edge of the stove frame with a notch (67) on the gas pipe side, slightly to the left of the pipe, to allow users to observe the flames and adjust them according to their needs. Without this notch (67), the users are unable to see the flames if the diameter of a utensil is greater than that of the edge of the stove frame. This notch (67) also allows users to insert an ignition tool to start a fire at the cover lid.

FIG. 3 demonstrates the small stove frame (37) that is designed with a wedge elevating from all around the edge of the frame in the same manner as the stove frame, and with a notch (68) to allow users to view the flames or insert an ignition tool.

Each part of the high-pressure gas stove frame according to this invention, as previously described, can be used with any regular high-pressure gas stove burner. For example, the wedge on the upper internal surface of the gas pipe alone can increase the energy-saving efficiency of any common burner. The continuous explanation of this invention is merely for the convenience in understanding it.

The Best Invention

The best invention is as previously mentioned.

The Production in Industry

This invention can be produced by an aluminum mold normally used for manufacturing any common burners. The mold can be easily removed once the process is complete (This is because characters of projecting wedges, flow-splitting rails, and all the curved portions of this invention have their sizes increased from small to large, or tapered from large to small.) The manufacture can be carried out in mass product, which will help reduce cost. Drilling gas holes can be done by automatic drilling machines to hasten the process. Grinding surfaces in parts where the cover lid and the gas cylinder are in contact can be done with the process similar to grinding any cast iron.

Claims

1. The high-pressure gas stove burner comprises of a nozzle valve (1) that distributes gas through an air socket (2), with an adjusting knob (3) to trap the required amount of air into a gas pipe (4). The gas then flows to a gas cylinder (5) before entering a cover lid (6) above the cylinder. The cover lid consists of a series of outer (7) and inner (8) gas holes that distribute the gas to burn inside a stove frame (9), which protects the combustion from external wind as well as preserves the heat. This high-pressure gas stove burner has the following **specific character**: a wedge with its size increased along the upper internal surface of the gas pipe. The smaller side of the wedge points toward the air socket; whereas the larger side points toward the cylinder.
2. The high-pressure gas stove burner which inside its gas cylinder has the following **specific character**: curved wedges (26) on both sides of the bottom of the gas cylinder that encircle the flow of the gas stream, which exits from the gas pipe. Its starting position is located between the gas cylinder and the end of the gas pipe. Its front near the gas pipe is bent upward. The top portion of the wedge is slightly trimmed (33) and gradually elevated through the middle of the gas cylinder until it reaches the opposite side of the gas pipe.
3. The high-pressure gas stove burner which inside its gas cylinder has the following **specific character**: projecting wedges (25) risen from the bottom of the gas cylinder on the opposite side of the gas pipe. These tapered wedges have their small ends pointing towards the gas pipe. From top view, they are seen curved and parallel with both the gas cylinder and a hollow cylinder (24) inside the gas cylinder. They also appear similar to a half circle. Edges of their small ends are located between the middle of the gas cylinder and the end of the gas pipe.
4. The high-pressure gas stove burner that has the following **specific character**: its cover lid that, when placing on top of the gas cylinder, creates a conduit, or a pathway for the gas flow (41) underneath the outer and inner gas holes on both sides of the hollow cylinder (24) that terminates at area on the opposite side of the gas pipe (34).
5. The high-pressure gas stove burner which inside its gas cylinder has the following **specific character**: the bottom of the gas cylinder is twin cup-like rails (29) (30) with their entrances allowing the movement of the gas flow to begin (31) from between the middle of the gas cylinder and the end of the gas pipe on both sides of the hollow cylinder. Before their exits, the rails are curved upward to the gas cylinder on the opposite side of the gas pipe to prevent the flow of the gas, which travels in

roundabout, from collision, hence allowing the gas to flow towards the gas holes on the lid on the opposite side of the gas pipe.

6. The high-pressure gas stove burner according to claim no.5 has the following **specific character**: the twin rails in claim no.5 with their entrances (31) greater in size than their exits (32) to pressurize the flow of the gas (35) while it travels around the hollow cylinder (24), before it finally ascends to the entrance of the gas cylinder on the opposite side of the gas pipe (34).

7. The high-pressure gas stove burner which outside its lid has the following **specific character**: a curved rail (69), visible when viewing from the cross section, lying between the series of outer (7) and inner (8) gas holes.

8. The high-pressure gas stove burner which its gas cylinder has the following **specific character**: outstretching wings (52) from the side, on particular portion or all around, which can be assembled to any part of the stove frame. Therefore, the gas cylinder can be attached to the stove frame without having the cylinder's legs (48) fixed with the supporting structure of the stove frame (49).

9. The high-pressure gas stove burner according to claim no.7 has the following **specific character**: a small stove frame (37) placing on top of the outstretching wings (52).

10. The high-pressure gas stove burner which its gas cylinder has the following **specific character**: a projecting tube (46) with its peak, or exit, located underneath the vicinity where the tips of the flames (47) from inner holes connect to allow cold air from beneath the gas cylinder to flow through the tube to enhance the combustion in the area with highest temperature. There is an outstretching wing from around the bottom portion of the external wall that connects with the hollow cylinder (24) to prevent the bases of the flames from losing the heat.

11. The gas stove burner according to claims no.7 and 9 has the following **specific character**: inward curves or notches (56) on the bottom edge of the small stove frame that fit perfectly on top of the outstretching wings (52) to prevent the small frame from moving in counterclockwise or clockwise direction, and bulges (57) on top of the wings of the gas cylinder that prevent the small stove frame from moving in left or right direction in the horizontal plane.

12. The small stove frame according to claim no.8 has the following **specific character**: vertical fins (59) stretching from the internal body of the small stove frame (37) to protect the bases of the outer flames from wind.

13. The high-pressure gas stove burner that has the following **specific character**: a bolt (42) projecting from the gas cylinder (5) and a hole (43) that interlocks with this bolt on the cover lid, or the other way round, to prevent the lid, while placing on top of the gas cylinder, from moving in counterclockwise or clockwise direction in the horizontal plane.
14. The high-pressure gas stove burner which its stove frame has the following **specific character**: a curved wedge (63) elevating from all around the edge of the frame. The top portion of this wedge on the frame side is trimmed (65) to improve its ability to preserve heat from the flames, which collide with the bottom of utensils before leaving the stove frame.
15. The high-pressure gas stove burner which its stove frame has the following **specific character**: a curved wedge (63) on the edge of the stove frame (9) with a notch (67), or hole, for viewing the flames or inserting an ignition tool.
16. The high-pressure gas stove burner which its small stove frame has the following **specific character**: a curved wedge on the edge of the small stove frame with a notch (68), or hole, for viewing the flames or inserting an ignition tool.
17. The high-pressure gas stove burner with its gas-distributing lid has the following **specific character**: a removable ring placing on top of its edge to reflect light. The ring's upper surface (62) is similar to a cup; its outer surface is higher than its inner surface.