

STOVE BURNER

BACKGROUND

5 1. Technical Field

The present invention relates to a stove burner including a burner head configured to have a plurality of flame holes in the outer circumferential portion thereof, a mixing pipe connected to a burner head, and a gas nozzle configured to
10 have a nozzle hole for discharging fuel gas to the inlet of the mixing pipe.

2. Description of the Related Art

As this type of a stove burner, there has been
15 conventionally known a stove burner including a cylindrical air damper for controlling the amount of primary air drawn via the inlet of a mixing pipe (see, for example, patent document 1). In this type of stove burner, a portion of the air damper is inserted into the mixing pipe, and primary air is drawn to
20 the mixing pipe through an axial gap formed between an end portion of an air damper, protruding from the mixing pipe, and a gas nozzle.

Furthermore, in patent document 1, there is described a technology in which the air damper is pressed and fastened by
25 a screw which is coupled to the outer surface of the mixing

pipe in a threaded manner in a radial direction, an interlocking device configured to interlock with a manipulator disposed on the upper plate of the stove and move the air damper in an axial direction is installed, and the amount of drawn primary air can be controlled by the manipulation of the manipulator. Furthermore, since it is recently required that the amount of drawn primary air is prevented from being freely changed by the manipulation of a user on the outer surface of a stove, the method of moving an air damper using an interlocking device is not employed.

Meanwhile, to discharge a gas mixture (a mixture of fuel gas and primary air) having a uniform air-fuel ratio from a plurality of flame holes in the outer circumferential portion of a burner head and desirably burn the gas mixture, it is required that the central axis line of an air damper is aligned with the axis of a nozzle hole. However, as described above in conjunction with the example of the related art, when the air damper is fastened to the mixing pipe by a screw, the air damper is tilted depending on the fastening state of the screw, and thus the central axis line is tilted toward the axis of the nozzle hole. Furthermore, in the case of using the interlocking device, the air damper is tilted by the amount of sliding clearance of the mixing pipe, and thus it is difficult to align the central axis line of the air damper with the axis of the nozzle hole.

[Related Art Document]

[Patent Document]

Patent document 1: Japanese Unexamined Utility Model
5 Publication No. Sho 60-5229

SUMMARY

Accordingly, the present invention has been made keeping
10 in mind the above problems occurring in the related art, and
an object of the present invention is to provide a stove
burner configured such that the central axis line of an air
damper is aligned with the axis of a nozzle hole, and thus a
gas mixture having a uniform air-fuel ratio is discharged from
15 a plurality of flame holes in the outer circumferential
portion of a burner head.

In order to achieve the above object, there is provided a
stove burner, including: a burner head configured to have a
plurality of flame holes in the outer circumferential portion
20 thereof; a mixing pipe connected to the burner head; a gas
nozzle configured to have a nozzle hole for discharging fuel
gas to the inlet of the mixing pipe; and a cylindrical air
damper configured to control the amount of primary air drawn
to the mixing pipe; wherein the base portion of the air damper
25 is attached to the gas nozzle so that the central axis line of

the air damper is aligned with the axis of the nozzle hole;
and wherein primary air is drawn to the mixing pipe through an
axial gap formed between the front end of the air damper,
located in front of the gas nozzle in the axial direction, and
5 the inlet of the mixing pipe.

According to the present invention, the base portion of
the air damper is attached to the gas nozzle, and thus the
mutual location relevance between the air damper and the gas
nozzle is ensured, with the result that the central axis line
10 of the air damper may be accurately aligned with the axis of
the nozzle hole. For this reason, the primary air drawn
through the axial gap between the front end of the air damper
and the inlet of the mixing pipe is uniformly distributed
across the overall surrounding area of a gas stream discharged
15 from the nozzle hole. As a result, a burning state becomes
desirable because a gas mixture having a uniform air-fuel
ratio may be discharged from the plurality of flame holes in
the outer circumferential portion of the burner head.

Furthermore, methods of attaching the base portion of the
20 air damper to the gas nozzle include: a method of coupling the
base portion of the air damper to the outer circumferential
portion of the gas nozzle in a threaded manner; and a method
of forming a bent edge portion configured to be bent in a
radially inward direction on the base portion of the air
25 damper, and inserting the bent edge portion between a nozzle

supporting member configured to couple the gas nozzle thereto in a threaded manner and a flange portion configured to be formed on the outer circumferential portion of the gas nozzle or between the flange portion formed on the outer
5 circumferential portion of the gas nozzle and a pressing member configured to be coupled to the outer circumferential portion of the gas nozzle in a threaded manner from the front side of the axial direction thereof. In particular, the method of coupling the base portion of the air damper to the
10 outer circumferential portion of the gas nozzle in a threaded manner is advantageous in that the amount of drawn primary air may be controlled by varying the size of the axial gap between the front end of the air damper and the inlet of the mixing pipe in such a way that the air damper is advanced and
15 retracted in an axial direction by rotation.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and advantages of
20 the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of a stove burner according to a first embodiment of the present invention;

25 FIG. 2 is a sectional view taken along line II-II of FIG.

1;

FIG. 3 is a sectional view of a stove burner according to a second embodiment of the present invention;

FIG. 4 is a perspective view of an air damper installed
5 in the stove burner of the second embodiment; and

FIG. 5 is a sectional view of a stove burner according to a third embodiment of the present invention.

DETAILED DESCRIPTION

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In FIGS. 1 and 2, reference symbol 1 designates a burner holder installed in a stove body omitted in the drawings, and a stove burner 2 is supported by the burner holder 1. The burner holder 1 includes: a base seat 11 configured as a
15 nozzle supporting member to which a gas nozzle 6, which will be described later, is attached; a support column 12 uprightly installed at one end of the base seat 11; and an upper plate 13 configured to protrude from the upper end of the support column 12 to be opposite to the base seat 11.

20 The stove burner 2 includes: a burner head 3 configured to have a plurality of flame holes 3a in the outer circumferential portion thereof, and to have a circular shape when viewed in a plan view; a disc-shaped burner cap 4 mounted on the burner head 3; a mixing pipe 5 vertically installed at
25 the center of the lower surface of the burner head 3; and a

gas nozzle 6 configured to have a nozzle hole 6a for discharging fuel gas to the inlet 5a of the lower end of the mixing pipe 5. The gas nozzle 6 is coupled to the upper surface of the base seat 11 in a threaded manner in the burner holder 1, and thus fuel gas is supplied to the gas nozzle 6 through a gas path 11a formed in the base seat 11.

Furthermore, a cylindrical support portion 13a concentric with the gas nozzle 6 (the axis of the nozzle hole 6a) is formed on the upper plate 13 of the burner holder 1. The burner head 3 is supported in the state in which the burner head 3 is centered on the burner holder 1 by fitting the mixing pipe 5 into the cylindrical support portion 13a so that the gas nozzle 6 and the mixing pipe 5 are located along the same axial line. Furthermore, the mixing pipe 5 does not include a Venturi portion whose diameter decreases compared to that of the inlet 5a, and draws primary air from the inlet 5a using the radial Venturi effect, which will be described later.

The burner head 3 includes: a ring-shaped protrusion portion 3b configured to protrude from the edge of the opening of the upper end of the mixing pipe 5 in an upward direction; and a ring-shaped wall 3c configured to protrude from the outer circumferential portion of the upper surface of the burner head 3 in an upward direction. The plurality of flame holes 3a in the form of grooves depressed from the upper end

surface of the ring-shaped wall 3c in a downward direction are formed in the ring-shaped wall 3c at predetermined intervals along a circumferential direction.

5 A rear plate 4a is attached to the lower surface of the burner cap 4 to be opposite to the upper end surface of the protrusion portion 3b with a gap between the rear plate 4a and the upper end surface of the protrusion portion 3b. A plurality of centering pieces 4b are vertically installed on the outer circumferential portion of the rear plate 4a at
10 predetermined intervals along a circumferential direction, and the lower ends of the centering pieces 4b come into contact with the outer circumferential surface of the protrusion portion 3b, thereby centering the burner cap 4 on the burner head 3.

15 When fuel gas is discharged from the gas nozzle 6, the so-called radial Venturi effect occurs because a gas stream drawn to the burner head 3 through the mixing pipe 5 is widened on the lower surface of the rear plate 4a in a radial direction, and thus primary air is drawn from the inlet 5a of
20 the mixing pipe 5. A gas mixture of the fuel gas and the primary air is discharged from the flame holes 3a in the outer circumferential portion of the burner head 3, and the gas mixture is burned through the supply of second air from the outside of the burner head 3.

25 Furthermore, the stove burner 2 includes a cylindrical

air damper 7 configured to appropriately control the amount of primary air drawn to the mixing pipe 5 according to the type of gas. In the present embodiment, the base portion (the lower end portion) of the air damper 7 is attached to the gas nozzle 6. The primary air is drawn to the mixing pipe 5 through an axial gap between the front end (the upper end) of the air damper 7, located in front of the gas nozzle 6 in an axial direction, and the inlet 5a of the mixing pipe 5. This will be described in detail below.

10 The gas nozzle 6 includes a cylindrical portion 6d, having a smaller diameter than a flange portion 6c, between a front-end taper portion 6b configured to have the nozzle hole 6a and a center flange portion 6c seated on the base seat 11. A male screw is formed on the outer circumferential surface of the cylindrical portion 6d. A female screw corresponding to 15 the male screw is formed on the inner circumferential surface of the air damper 7, and thus the base portion of the air damper 7 is coupled to the outer circumferential portion of the cylindrical portion 6d in a threaded manner.

20 As described above, when the base portion of the air damper 7 is attached to the gas nozzle 6, the mutual location relevance between the air damper 7 and the gas nozzle 6 is ensured, and thus the central axis line of the air damper 7 may be accurately aligned with the axis of the nozzle hole 6a. 25 For this reason, the primary air drawn through the axial gap

between the front end of the air damper 7 and the inlet 5a of the mixing pipe 5 is uniformly distributed across the overall surrounding area of a gas stream discharged from the nozzle hole 6a. As a result, a burning state becomes desirable
5 because a gas mixture having a uniform air-fuel ratio may be discharged from the plurality of flame holes 3a in the outer circumferential portion of the burner head 3.

Furthermore, in the present embodiment, the air damper 7 may be advanced and retracted in an axial direction by
10 rotation because the air damper 7 is coupled to the gas nozzle 6 in a threaded manner. Accordingly, the amount of drawn primary air may be controlled by varying the size of the axial gap between the front end of the air damper 7 and the inlet 5a of the mixing pipe 5.

15 A second embodiment shown in FIGS. 3 and 4 is described below. Since the basic structure of the stove burner 2 of the second embodiment is not significantly different from that of the first embodiment, the same reference symbols are assigned to the same members and portions as in the first embodiment.

20 The second embodiment and the first embodiment differ in a method of attaching an air damper 7 to a gas nozzle 6 and the structure of the air damper 7, which is described in detail below. In the second embodiment, a ring-shaped bent edge portion 7a, which is bent in a radially inward direction,
25 is formed on the base portion (the lower end portion) of an

air damper 7. The base portion of the air damper 7 is attached to a gas nozzle 6 by inserting the bent edge portion 7a between a base seat 11 and the flange portion 6c of the gas nozzle 6. Furthermore, as shown in FIG. 3, a stepped portion 5 6c', which is spaced apart from the base seat 11 by the plate thickness of the bent edge portion 7a, is formed on the outer circumferential portion of the lower surface of the flange portion 6c, and the bent edge portion 7a is inserted between the stepped portion 6c' and the base seat 11. Furthermore, 10 the gas nozzle 6 does not include the cylindrical portion 6d of the first embodiment.

In the second embodiment, since the base portion of the air damper 7 is attached to the gas nozzle 6, the central axis line of the air damper 7 is aligned with the axis of the 15 nozzle hole 6a in the same manner as that of the first embodiment, and thus a gas mixture having a uniform air-fuel ratio may be discharged from a plurality of flame holes 3a in the outer circumferential portion of a burner head 3.

Furthermore, in the second embodiment, the air damper 7 20 is composed of a first cylindrical member 71 disposed on a base portion side (a lower side) and configured to have the bent edge portion 7a, and a second cylindrical member 72 disposed on a front end side (an upper side) and fitted on the outer surface of the first cylindrical member 71. Bent 25 tongue-shaped portions 71a protruding to outer sides in radial

directions are provided at two respective locations in the circumferential direction of the upper end of the first cylindrical member 71. Furthermore, vertical holes 72a configured such that the tongue-shaped portions 71a are fitted
5 thereinto from therebelow, and two-stage upper and lower horizontal holes 72b and 72c configured to extend from the edge of one side of the vertical hole 72a to the other side of the vertical hole 72a along the circumferential direction thereof are formed at two locations in the circumferential
10 direction of the second cylindrical member 72. The length of the air damper 7 may be changed in three stages by selectively coupling the tongue-shaped portion 71a to the upper end of the vertical hole 72a, to the upper stage horizontal hole 72b, and to the lower stage horizontal hole 72c. Accordingly, the
15 amount of drawn primary air of the mixing pipe 5 may be controlled by varying the size of the gap between the front end (the upper end of the second cylindrical member 72) of the air damper 7 and the inlet 5a of the mixing pipe 5.

Furthermore, the second cylindrical member 72 has a
20 relatively large diameter approximate to that of the lower end portion of the mixing pipe 5, and thus, in the case of boiling over in large quantities, boiling-over liquid may permeate from the second cylindrical member 72 into the air damper 7. Accordingly, a hole 71b is formed in the lower portion of the
25 circumferential surface of the first cylindrical member 71,

and thus the boiling-over liquid having permeated into the air damper 7 may be drained via the hole 71b.

Next, a third embodiment shown in FIG. 5 is described. In the third embodiment, since the basic structure of a stove burner 2 is not significantly different from that of the first embodiment, the same reference symbols are assigned to the same members and portions as in the first embodiment.

The third embodiment and the first embodiment differ in a method of attaching an air damper 7 to a gas nozzle 6, which is described in detail below. In the third embodiment, a bent edge portion 7a, which may be seated on the upper surface of the flange portion 6c of a gas nozzle 6 and is bent in a radially inward direction, is formed on the base portion (the lower end) of an air damper 7. Furthermore, the gas nozzle 6 is provided with a nut 61, i.e., a pressing member that is engaged with the male screw of the outer circumferential surface of the cylindrical portion 6d in a threaded manner from the front side (the upper side) of the axial direction. The base portion of the air damper 7 is attached to the gas nozzle 6 by inserting the bent edge portion 7a between the flange portion 6c and the nut 61.

In the third embodiment, since the base portion of the air damper 7 is attached to the gas nozzle 6, the central axis line of the air damper 7 is aligned with the axis of the nozzle hole 6a in the same manner as that of the first

embodiment, and thus a gas mixture having a uniform air-fuel ratio may be discharged from a plurality of flame holes 3a in the outer circumferential portion of a burner head 3.

Furthermore, in the third embodiment, various types of
5 air dampers 7 having different lengths are prepared, and an air damper 7 having an appropriate length according to the type of gas is selected and attached to the gas nozzle 6, and thus the amount of primary air drawn to the mixing pipe 5 is appropriately controlled according to the type of gas.

10 Although the embodiments of the present invention have been described with reference to the drawings, the present invention is not limited thereto. For example, in the second embodiment, it may be possible that the air damper 7 is not composed of two members, but various types of air dampers 7
15 having different lengths are provided and an air damper 7 having an appropriate length according to the type of gas is selected and attached to the gas nozzle 6, as in the third embodiment. Alternatively, in the third embodiment, it may be possible that the air damper 7 is composed of two members, as
20 in the second embodiment, and the length of an air damper 7 is varied according to the type of gas. Furthermore, in the third embodiment, although the nut 61 is employed as a pressing member that is coupled to the outer circumferential portion of the gas nozzle 6 in a threaded manner from the
25 front side of the axial direction, the pressing member may be

composed of a spring washer having a female screw in the inner circumferential portion thereof or the like. Furthermore, although the present invention is applied to the stove burner 2 in which the mixing pipe 5 does not include the Venturi portion and draws primary air from the inlet 5a of the mixing pipe 5 using the radial Venturi effect in the above-described embodiments, the present invention may be also applied to a stove burner in which a mixing pipe includes a Venturi portion.

10 Although the specific embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible without departing from the scope and spirit of the invention as disclosed in the
15 accompanying claims.

[Description of Reference Symbols]

1: burner holder
11: base seat (nozzle supporting member)
2: stove burner
20 3: burner head
3a: flame hole
5: mixing pipe
5a: inlet
6: gas nozzle
25 6a: nozzle hole

6c: flange portion

61: nut (pressing member)

7: air damper

7a: bent edge portion

WHAT IS CLAIMED IS:

1. A stove burner, comprising:

a burner head configured to have a plurality of flame
5 holes in an outer circumferential portion thereof; a mixing
pipe connected to the burner head; a gas nozzle configured to
have a nozzle hole for discharging fuel gas to an inlet of the
mixing pipe; and a cylindrical air damper configured to
control an amount of primary air drawn to the mixing pipe;
10 wherein a base portion of the air damper is attached to
the gas nozzle so that a central axis line of the air damper
is aligned with an axis of the nozzle hole; and

wherein primary air is drawn to the mixing pipe through
an axial gap formed between a front end of the air damper,
15 located in front of the gas nozzle in an axial direction, and
the inlet of the mixing pipe.

2. The stove burner of claim 1, wherein the base portion
of the air damper is coupled to an outer circumference of the
20 gas nozzle in a threaded manner.

3. The stove burner of claim 1, wherein a bent edge
portion configured to be bent in a radially inward direction
is formed on the base portion of the air damper, and is
25 inserted between a nozzle supporting member configured to

couple the gas nozzle thereto in a threaded manner and a flange portion configured to be formed on an outer circumference of the gas nozzle.

5 4. The stove burner of claim 1, wherein a bent edge portion configured to be bent in a radially inward direction is formed on the base portion of the air damper, and is inserted between a flange portion formed on an outer circumference of the gas nozzle and a pressing member
10 configured to be coupled to the outer circumference of the gas nozzle in a threaded manner from a front side of an axial direction thereof.