

COMBUSTION SUPPORTING DEVICE

BACKGROUND

Technical Field

[0001] The instant disclosure relates to a combustion supporting device, in particular, to
5 a combustion supporting device provided to maintain the temperature inside a combustion
furnace and to allow the combustion furnace to perform better combustion performance.

Related Art

[0002] Combustion furnaces burn combustible materials, such as woods, leaves, papers,
charcoals or other biomass fuels therein, so that the combustion furnace can be used to
10 cook or to generate heat. Conventionally, a combustion furnace includes an inner shell
and an outer shell. The inner shell is provided as the space for the combustion.
Combustion furnaces are also used as heat providers for families. In addition to large
sized combustion furnaces used in households or industries, combustion furnaces are also
suitable for outdoor activities, and the volume and weight of combustion furnaces have
15 gradually been reduced to allow for personal combustion furnaces.

[0003] Additionally, the combustion efficiency of the combustion furnace depends on
whether the gas inside the combustion furnace flows fluently to maintain the temperature
inside the combustion furnace. Conventionally, due to the heat convection of the
combustion furnace being insufficient, the temperature inside the combustion furnace is
20 insufficient, resulting in incomplete combustion. Consequently, combustion in the
conventional combustion furnace takes more time, and the user needs to add fuel to the
combustion furnace continuously, to maintain the internal temperature.

SUMMARY

[0004] Consequently, how to maintain the temperature inside the combustion furnace
25 and how to improve the performance of the combustion furnace, are issues to be addressed

by the applicants and related personnel.

[0005] To address this issue, the instant disclosure provides a combustion supporting device to be used with a combustion furnace. The combustion supporting device comprises a cone body, a tubular member, a cone-shaped member, a base plate and a supporting portion. An upper end of the tubular member is connected to the cone body. The tubular member defines a plurality of gas holes around an upper portion thereof. The cone-shaped member defines an insertion opening thereon. The diameter of the insertion opening corresponds to the outer diameter of the tubular member. A lower portion of the tubular member is passing through the insertion opening and received in the cone-shaped member. The base plate defines a hole corresponding to the tubular member. The base plate is connected to a bottom of the cone-shaped member. The hole communicates with a lower opening of the tubular member. The supporting portion is connected to the base plate.

[0006] In some implementation aspects, the combustion supporting device is made of heat-resistant steel or ceramic composite material.

[0007] In some implementation aspects, the range of the outer diameter of the tubular member is defined from 1 cm to 30 cm.

[0008] In some implementation aspects, the range of the diameter of each of the gas holes is defined from 0.3 cm to 5 cm.

[0009] In some implementation aspects, the supporting portion of the combustion supporting device is a plurality of supporting rods connected to the base plate.

[0010] In some implementation aspects, the base plate further comprises a plurality of positioning holes. The number of the positioning holes corresponds to the number of the supporting rods. Each of the supporting rods comprises a connecting member and a stand. One of two ends of each of the stands is passing through the corresponding

positioning hole and connected to the connecting member, and the other end of each of the stands is exposed from a bottom plane of the base plate.

[0011] In some implementation aspects, the outer surface of the lower portion of the tubular member and an inner wall of the cone-shaped member define a filling space
5 therein

[0012] In some implementation aspects, the combustion supporting device further comprises at least one heat-resistant material placed in the filling space.

[0013] In some implementation aspects, the heat-resistant material is powdered.

[0014] In some implementation aspects, the heat-resistant material is a ceramic
10 material.

[0015] Based on the above, the combustion supporting device may be a mechanical structure and mated with a combustion furnace. The tubular member and the cone body are assembled with each other to define a space in which gas can freely flow in the space. The gas holes defined around the upper portion of the tubular member allows the
15 combustion supporting device to maintain the temperature inside the combustion furnace, so that the complete combustion can be achieved and black smoke and dust can be reduced.

[0016] Detailed description of the characteristics and the advantages of the disclosure is shown in the following embodiments, the technical content and the implementation of the
20 disclosure should be readily apparent to any person skilled in the art from the detailed description, and the purposes and the advantages of the disclosure should be readily understood by any person skilled in the art with reference to content, claims and drawings in the disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

The disclosure will become more fully understood from the detailed description given herein below for illustration only, and thus not limitative of the disclosure, wherein:

Fig. 1 is a perspective view of a first embodiment of a combustion supporting device according to the instant disclosure;

Fig. 2 is a perspective view of a second embodiment of a combustion supporting device according to the instant disclosure;

Fig. 3 is a perspective view of a third embodiment of a combustion supporting device according to the instant disclosure; and

Fig. 4 is a sectional view of a fourth embodiment of a combustion supporting device according to the instant disclosure.

DETAILED DESCRIPTION

[0017] Please refer to Fig. 1, illustrating a perspective view of a first embodiment of a combustion supporting device 1 according to the instant disclosure. The combustion supporting device 1 is to be used with a combustion furnace and comprises a cone body 11, a tubular member 12, a cone-shaped member 13, a base plate 14 and a supporting portion 15. An upper end of the tubular member 12 is connected to the cone body 11. The tubular member 12 defines a plurality of gas holes 121 around an upper portion thereof. The cone-shaped member 13 defines an insertion opening 131 thereon. The diameter of the insertion opening 131 corresponds to the outer diameter of the tubular member 12. A lower portion of the tubular member 12 is passing through the insertion opening 131 and received in the cone-shaped member 13. The base plate 14 defines a hole 141 thereon (as shown in Fig. 4), and the hole 141 corresponds to the tubular member 12. The base plate 14 is connected to a bottom of the cone-shaped member 13. The hole 141 communicates

with a lower opening of the tubular member 12. The supporting portion 15 is connected to the base plate 14.

[0018] In some implementation aspects, the combustion supporting device 1 is made of heat-resistant steel or ceramic composite material.

5 [0019] In some implementation aspects, the range of the outer diameter of the tubular member 12 is defined from 1 cm to 30 cm. Preferably, the range of the outer diameter of the tubular member 12 is defined from 2 cm to 10 cm.

[0020] In some implementation aspects, the range of the diameter of each of the gas holes 121 is defined from 0.3 cm to 5 cm. Preferably, the range of the diameter of each
10 of the gas holes 121 is defined from 0.5 cm to 1.5 cm.

[0021] Please refer to Fig. 2, illustrating a perspective view of a second embodiment of a combustion supporting device 1 according to the instant disclosure. In this embodiment, the supporting portion 15 of the combustion supporting device 1 is a plurality of supporting rods 16 connected to the base plate 14. For example, the
15 supporting rods 16 are connected to the base plate 14 by welding techniques.

[0022] Please refer to Fig. 3, illustrating a perspective view of a third embodiment of a combustion supporting device 1 according to the instant disclosure. In this embodiment, the base plate 14 further comprises a plurality of positioning holes 142 (as shown in Fig. 3 and Fig. 4). The number of the positioning holes 142 corresponds to the number of the
20 supporting rods 16. Each of the supporting rods 16 comprises a connecting member 161 and a stand 162. One of two ends of each of the stands 162 is passing through the corresponding positioning hole 142 and connected to the connecting member 161, and the other end of each of the stands 162 is exposed from a bottom plane of the base plate 14. As shown in Fig. 3, in this embodiment each of the connecting members 161 comprises a
25 nut and a washer, and the stands 162 are screws, so that the screws are respectively

threaded with the nuts and the washers, but embodiments are not limited thereto.

[0023] The combustion supporting device 1 is provided to be assembled to a bottom of an inner shell of the combustion furnace, and the supporting portion 15 (or the supporting rods 16) is securely or detachably connected to the inner shell of the combustion furnace.

5 The height of the supporting portion 15 (or heights of the supporting rods 16), allows a vertical distance to be defined between the bottom of the cone-shaped member 13 and the bottom of the inner shell. The vertical distance may be at the range from 0.3 cm to 20 cm. Preferably, the vertical distance is at the range from 1 cm to 5 cm.

[0024] Accordingly, the combustion supporting device 1 according to the instant
10 disclosure is provided to assemble in the combustion furnace. The supporting portion 15 (or the supporting rods 16), is then connected with the inner shell of the combustion furnace so as to fix the combustion supporting device 1 with the inner shell. The inner shell defines a through hole at a bottom thereof, and the combustion supporting device 1 is assembled above the through hole. the vertical distance between the bottom of the
15 cone-shaped member 13 and the bottom of the inner shell of the combustion furnace allows parts of rotating air flows to be guided into the interior of the inner shell from the hole at the base plate, so that the gases are passing through the combustion supporting device 1 to induce a rotating combustion field for facilitating the combustion inside the combustion furnace.

20 [0025] Please refer to Fig. 4, illustrating a sectional view of a fourth embodiment of a combustion supporting device 1 according to the instant disclosure. As shown, the outer surface of the lower portion of the tubular member 12 and an inner wall of the cone-shaped member 13 define a filling space 17 therein, and the combustion supporting device 1 further comprises at least one heat-resistant material 2 placed in the filling space
25 17. The heat-resistant material 2 is powdered and is a ceramic material. The

heat-resistant material 2 can be made of, but not limited to, zirconium oxide or aluminum oxide.

[0026] Base on the above, the combustion supporting device may be a mechanical structure and mated with a combustion furnace. The tubular member and the cone body are assembled with each other to define a space in which gas can freely flow in the space. The gas holes defined around the upper portion of the tubular member allows the combustion supporting device to maintain the temperature inside the combustion furnace. In addition, the rotating high-temperature flame generated by the combustion supporting device and the air flows within the interior of the combustion furnace would draw the incomplete burned smokes or dusts back to the combustion region of the combustion furnace. Accordingly, the complete combustion can be achieved and black smokes and dusts emitted from the combustion furnace can be reduced.

[0027] While the disclosure has been described by the way of example and in terms of the preferred embodiments, it is to be understood that the invention need not be limited to the disclosed embodiments. On the contrary, it is intended to cover various modifications and similar arrangements included within the spirit and scope of the appended claims, the scope of which should be accorded the broadest interpretation so as to encompass all such modifications and similar structures.

CLAIMS

What is claimed is:

1. A combustion supporting device, to be used with a combustion furnace, the combustion supporting device comprising:

5 a cone body;

 a tubular member, an upper end of the tubular member connected to the cone body, the tubular member defining a plurality of gas holes around an upper portion thereof;

 a cone-shaped member, defining an insertion opening thereon, the diameter of
10 the insertion opening corresponding to the outer diameter of the tubular member, a lower portion of the tubular member passing through the insertion opening and received in the cone-shaped member, wherein the outer surface of the lower portion of the tubular member and an inner wall of the cone-shaped member define a filling space therein;

15 a base plate, defining a hole corresponding to the tubular member, the base plate is connected to a bottom of the cone-shaped member, wherein the hole communicates with a lower opening of the tubular member;

 a supporting portion, connected to the base plate; and

 a heat-resistant material, placed in the filling space.

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2. The combustion supporting device according to claim 1, wherein the combustion supporting device is made of heat-resistant steel or ceramic composite material.

3. The combustion supporting device according to claim 1 or 2, wherein the range of the
25 outer diameter of the tubular member is defined from 1 cm to 30 cm.

4. The combustion supporting device according to any one of claims 1 to 3, wherein the range of the diameter of each of the gas holes is defined from 0.3 cm to 5 cm.
5. The combustion supporting device according to any one of claims 1 to 4, wherein the supporting portion is a plurality of supporting rods connected to the base plate.
6. The combustion supporting device according to claim 5, wherein the base plate comprises a plurality of positioning holes, the number of the positioning holes corresponds to the number of the supporting rods, wherein each of the supporting rods comprises:
- a connecting member; and
 - a stand, one of two ends of the stand passing through the corresponding positioning hole and connected to the connecting member, and the other end of the stand is exposed from a bottom plane of the base plate.
7. The combustion supporting device according to claim 1, wherein the heat-resistant material is a ceramic material.
8. The combustion supporting device according to claim 1 or claim 7, wherein the heat-resistant material is powdered.