

FURNACE

TECHNICAL FIELD

[0001] The present disclosure relates to a furnace, in particular, relates to a furnace which utilizes a cone design on the inner barrel, such that the gases in an inner and outer barrel naturally generate vortex gas flow in the furnace during combustion.

BACKGROUND ART

[0002] In order to show the utmost respect to spirits and ancestors in folk festival, these festivals generally involve joss paper burning at the end of the festivals, and the amount of the burned joss paper also represent the devotion of people. Therefore, the speed of burning joss paper must be raised to allow people to burn enormous joss paper. Generally, the burning speed of a typical furnace is slow and prolongs the time taken to finish burning joss paper. In order to address this problem, manufacturers in related industries have invested great resources to find a solution. For example, R.O.C patent No. M479087 entitled "Furnace Structure" includes a barrel body, and the upper and lower part of the barrel body are respectively provided with a transverse separation sheet, a furnace body, and a support frame disposed in the furnace body. The barrel body is composed of an upper barrel body and a lower barrel body, and a vent hole is formed between the upper barrel body and the lower barrel body. A gap is formed between the transverse separation sheet and the upper barrel body, and a hollow column is disposed at the central location. After the joss paper (or ghost money) is placed on a rack set and ignited, air enters from between the furnace body and the upper barrel body and below the lower furnace body, and hot air generated from burning is discharged through the gap between the transverse separation sheet and the upper barrel body and the hollow column. However, the effect of generating vortex in the upper barrel body from the hot air is limited, resulting in combustion efficiency lower than

expectation. In other words, combustion efficiency of the furnace structure in the prior still needs to be improved.

SUMMARY OF THE PRESENT INVENTION

[0003] The objective of the present disclosure is to provide a furnace to improve combustion efficiency.

[0004] Therefore, a furnace according to the present disclosure is configured to burn paper and includes an outer barrel, an inner barrel, and a support frame. The outer barrel includes an upper sealing wall, a lower sealing wall, and a barrel wall connecting the upper sealing wall to the lower sealing wall. The barrel wall is formed with an upper wall section and a lower wall section connected with each other. A surrounding air intake is formed between the upper wall section and the lower wall section, and the upper wall section and the lower wall section are respectively provided with a sealable placement opening and a sealable ash removal opening. An upper portion of the upper wall section is formed with a plurality of exhaust holes. The inner barrel is disposed in an interior of the outer barrel, is in a generally U shape, and has a cone-like top wall and a side wall extending obliquely inward from the outer edge of the top wall. An upper portion of the side wall is in tight contact with the upper wall section of the barrel wall of the outer barrel, and a ventilating space is formed between a lower portion thereof and the upper wall section. A placing opening corresponding to the placement opening and a plurality of vent holes corresponding to the ventilating space are disposed on the side wall. The ventilating space is in communication with an interior of the inner barrel through the vent holes, a plurality of heat dissipation holes are disposed on the top wall, and an ash discharge opening is located at a central location. The support frame is disposed in the interior of the inner barrel to support paper and positioned slightly lower than the placing opening but higher than the surrounding air intake. When paper is placed on the support frame and ignited,

air enters through the surrounding air intake from outside and then enters the inner barrel respectively through the vent holes and from below the inner barrel. The incoming air in the inner barrel generates vortex and is discharged through the heat dissipation holes and exhaust holes. Combustion efficiency of the furnace can be effectively improved by the air generating vortex.

BRIEF DESCRIPTION OF DRAWINGS

[0005] Fig. 1 is a perspective view of a furnace according to one of the preferred embodiments of the present disclosure.

[0006] Fig. 2 is an exploded perspective view of a furnace according to one of the preferred embodiments of the present disclosure.

[0007] Fig. 3 is a perspective cross-sectional view of a furnace according to one of the preferred embodiments of the present disclosure.

[0008] Fig. 4 is a diagram illustrating a furnace in use according to one of the preferred embodiments of the present disclosure.

[0009] Fig. 5 is another diagram illustrating a furnace in use according to one of the preferred embodiments of the present disclosure.

DETAILED DESCRIPTION OF EMBODIMENTS

[0010] Referring to FIGs. 1-3, a furnace according to one of the preferred embodiments of the present disclosure is configured to burn paper, and the paper may be general paper or joss paper for festival. The embodiments of the present disclosure take joss paper as an example. The furnace includes an outer barrel 1, an inner barrel 2, and a support frame 3.

[0011] The outer barrel 1 includes an upper sealing wall 11, a lower sealing wall 12, and a barrel wall 13 connecting the upper sealing wall 11 to the lower sealing wall 12. The barrel wall 13 is formed with an upper wall section 131, a lower wall section 132, and multiple connecting members 133. The connecting members 133 connect the upper wall section 131 and the lower wall section 132, such that a surrounding air intake 134 is formed between the upper

wall section 131 and lower wall section 132. The upper wall section 131 and the lower wall section 132 are respectively provided with a sealable placement opening 135 and a sealable ash removal opening 136. In the embodiment of the present disclosure, the placement opening 135 and the ash removal opening 136 may be respectively covered by a covering body 14. An upper portion of the upper wall section 131 is formed with multiple exhaust holes 137, and multiple support members 138 are fixed on the inside of the lower wall section 132.

[0012] The inner barrel 2 is disposed in an interior of the outer barrel 1 and is supported and positioned by the support members 138. The inner barrel 2 is formed in a U shape, and has a top wall 21 and a side wall 22. The top wall 21, the upper wall section 131, and the upper sealing wall 11 jointly enclose an exhaust space 4. The exhaust space 4 is in communication with the exterior through the exhaust holes 137. The top wall 21 is formed with a flat top section 211 located at the outer edge thereof and a slanted top section 212 extending obliquely inward from the flat top section 211. The slanted top section 212 is disposed with multiple heat dissipation holes 213, and is disposed with an ash discharge opening 214 at a central location. The side wall 22 extends downward and obliquely inward from the flat top section 211 of the top wall 21, and the upper portion thereof and the upper wall section 131 of the barrel wall 13 of the outer barrel 1 are in tight contact with each other; namely, a sealed space is formed therebetween. The distance between the side wall 22 and the upper wall section 131 gradually increases from top to down to form a ventilating space 5. The side wall 22 are disposed with multiple vent holes 221 and a placing opening 222. The vent holes 221 correspond to the ventilating space 5, and therefore the ventilating space 5 is in communication with the interior of the inner barrel 2. The placing opening 222 is disposed to be corresponding to the placement opening 135.

[0013] The support frame 3 is set up in an interior of the inner barrel 2 to support paper, and is positioned slightly lower than the placing opening 222 but higher than the surrounding air intake 134. The support frame 3 is formed by multiple metal bars connected and spaced apart, and a central location thereof is formed with multiple protruding members 31 for naturally moving the paper toward and depositing the paper at an outer edge of the support frame 3 when the paper is placed on the support frame. Most of the paper on the support frame 3 fall between the metal bars, and the space between the metal bars promotes ventilation to help burning of the paper and to prevent smoldering.

[0014] When burning joss paper in the furnace according to an embodiment of the present disclosure, joss paper is placed on the support frame 3 through the placement opening 135 and the placing opening 222 at the beginning. The joss paper are under the influence of the protruding members 31 and are moved toward and deposited at the outer edge of the support frame 3. Referring to Fig. 4, cold air enters through the surrounding air intake 134 after the joss paper is ignited and hot air rises. The cold air subsequently enters the inner barrel 2 through the ventilating space 5 and the vent hole 221, and also from below the inner barrel 2. The hot air eventually enters the exhaust space 4 through the heat dissipation holes 213 on the top wall 21, and then is discharged to the exterior through the exhaust holes 137 on the outer barrel 1. During the process of burning, a portion of the ashes enters the exhaust space 4 with the rising hot air, and then the hot air turns and is discharged through the exhaust holes 137 on a lateral surface. At this time, the ashes are blocked by the upper sealing wall 11, fall on the slanted top section 212 of the top wall 21, and then slide downward from the ash discharge opening 214. In the end, the ashes, like most of the other ashes, fall below the outer barrel 1 and can be removed through the ash removal opening 136.

[0015] The design of the furnace according to the present disclosure can improve the combustion efficiency because of the air entering from the lateral surface of the inner barrel 2 in combination with the air entering the inner barrel 2 traveling upward from below. Furthermore, the top wall 21 is designed to have the slanted top section 212, such that vortex is generated in the hot air and the flow speed of air in the interior is increased, thereby improving the combustion efficiency. If the amount of the joss paper being burned is less, smaller vortex is generated in the hot air in the inner barrel 2, as shown in Fig. 5. In other words, no matter how much joss paper are being burned, vortex is generated in the hot air in the furnace according to the present disclosure, thus improving combustion efficiency.

[0016] It is worthy to note that the inverted-cone of the inner barrel 2 not only forms the sealed space with the outer barrel 1, but also forms a ventilating space 5. The objectives of these designs are to allow the air in the exterior to enter into the inner barrel 2 completely and generate vortex, providing sufficient air to help burning. In comparison with the conventional furnace which discharges some of the external air directly through the gap between the transverse separation sheet and the barrel body, the furnace according to the present disclosure can indeed improve the combustion efficiency.

[0017] Since the vortex is generated in the hot air in the inner barrel 2 during the process of burning, most ashes floated with the vortex flow are thrown out by centrifugal force, and then hit the side wall 22 of the inner barrel 2 and slide down. Additionally, the temperature of the air in the interior is lower when the burning of the joss paper begins, and the vortex temporarily does not separate the air and the ash completely. The amount of the air exhausted from the inner barrel 2 is less than the amount of the air exhausted from the outer barrel 1, resulting in a slower flow velocity in the inner barrel 2,

which in turn make the ash settle, slide into the inner barrel 2 from the top wall 21, and eventually fall below the outer barrel 1.

Reference numerals:

1 outer barrel
11 upper sealing wall
12 lower sealing wall
13 barrel wall
131 upper wall section
132 lower wall section
133 connecting member
134 surrounding air intake
135 placement opening
136 ash removal opening
137 exhaust hole
138 support member
14 covering body
2 inner barrel
21 top wall
211 flat top section
212 slanted top section
213 heat dissipation hole
214 ash discharge opening
22 side wall
221 vent hole
222 placing opening
3 support frame
31 protruding member
4 exhaust space
5 ventilating space

WHAT IS CLAIMED IS:

1. A furnace configured to burn paper, comprising:

an outer barrel having an upper sealing wall, a lower sealing wall, and a barrel wall connecting the upper sealing wall to the lower sealing wall, wherein the barrel wall is formed with an upper wall section and a lower wall section connecting with each other, a surrounding air intake is formed between the upper wall section and the lower wall section, the upper wall section and the lower wall section are respectively provided with a sealable placement opening and a sealable ash removal opening, and a plurality of exhaust holes are formed on an upper portion of the upper wall section;

an inner barrel disposed in an interior of the outer barrel, being in a generally U shape, and having a cone-like top wall and a side wall extending downward from an outer edge of the top wall, wherein an upper portion of the side wall is in tight contact with the upper wall section of the barrel wall of the outer barrel, and a ventilating space is formed between a lower portion of the side wall and the upper wall section, an placing opening corresponding to the placement opening and a plurality of vent holes corresponding to the ventilating space are disposed on the side wall, and the ventilating space are in communication with an interior of the inner barrel through the vent holes, a plurality of heat dissipation holes are disposed on the top wall, and an ash discharge opening is located at a central location; and

a support frame disposed in the interior of the inner barrel to support paper and positioned lower than the placing opening but higher than the surrounding air intake;

wherein air entering through the surrounding air intake enters the inner barrel respectively through the vent holes and from below the

inner barrel, and the incoming air in the inner barrel generates vortex and is discharged through the heat dissipation holes on the top wall and the exhaust holes on the upper wall section.

2. The furnace of claim 1, wherein the top wall comprises of a flat top section and a slanted top section, the heat dissipation holes distribute over the slanted top section, the ash discharge opening is located at a central position of the slanted top section, the side wall extends downward and obliquely inward from the top wall, and a distance between the side wall and the upper wall section gradually increases from top to down to form the ventilating space.
3. The furnace of claim 2, wherein the barrel wall is further formed with a plurality of connecting members, and the connecting members are connected respectively with the upper wall section and the lower wall section to form the surrounding air intake between the upper wall section and the lower wall section.
4. The furnace of claim 3, wherein the support frame is formed by a plurality of metal bars connected and spaced apart, and a central location thereof is formed with a plurality of protruding members for naturally moving the paper toward and depositing the paper at an outer edge of the support frame when the paper is placed on the support frame, and space between the metal bars promotes ventilation to help burning of the paper and to prevent smoldering.