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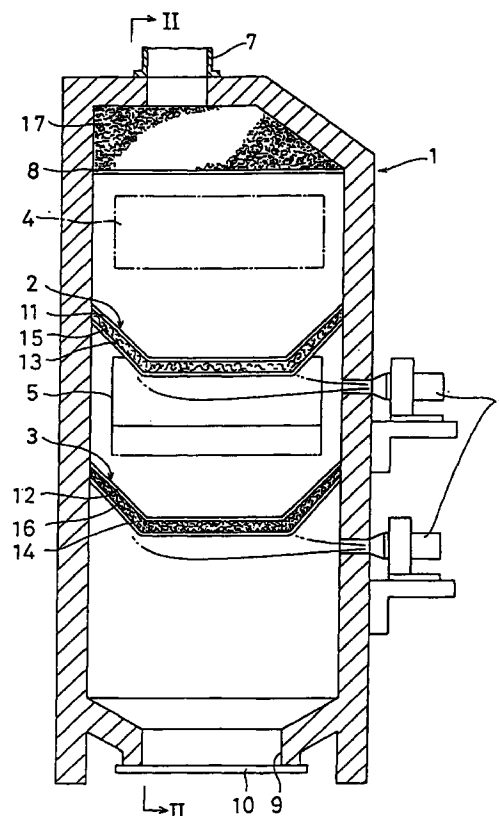
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(54) Incinerator

(57) An incinerator that is high in combustion efficiency, produces less noxious emissions and consumes less auxiliary fuel. The incinerator includes two beds (2,3) each having an upper (11,12) and a lower (13,14) crossbar and arranged one over the other in the incinerator body (1). The space between the crossbars of each bed is stuffed with tangled stainless steel whiskers (15,16). Such whiskers are also laid on a crossbar (8) provided near the top of the incinerator body. When wastes are burned in the incinerator, the whiskers are heated and turned red. The thus red-heated whiskers are brought into contact with unburned gas over a wide surface area, increasing the combustion efficiency. The whiskers of the upper bed has larger gaps therebetween than those of the lower bed so that wastes on the upper bed drop through the whiskers onto the lower bed when they burn and shrink in size. Gas permeability of each bed is thus maintained high, so that wastes can be burned completely and ashes remain little on the beds.

FIG. 1



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Description

BACKGROUND OF THE INVENTION

[0001] This invention relates to an incinerator for wastes.

[0002] Besides paper and wood pieces, wastes that are difficult to burn such as garbage are also put into waste incinerators. Wastes that are difficult to burn lower the combustion efficiency of an incinerator when put into the incinerator and also take a long time to burn. Moreover, such wastes reduce the burning temperature, thereby sharply increasing the production of dioxin, one of the major causes of today's environmental pollution. Further, incomplete burning of wastes increases the amount of ashes remaining in the incinerator after burning.

[0003] Auxiliary fuel such as heavy oil is used in large amounts to burn wastes that are difficult to burn in conventional incinerators. Use of such an auxiliary fuel not only increases the fuel cost but the production of noxious emissions.

[0004] An object of this invention is to provide an incinerator that is high in combustion efficiency, produces less noxious emissions and consumes less auxiliary fuel.

SUMMARY OF THE INVENTION

[0005] According to this invention, there is provided an incinerator comprising a body, an exhaust duct, at least one bed provided in the body, the bed comprising two gas-permeable bed plates provided one over the other with a space defined therebetween, and a packing material filling the space and comprising meshed, porous, honeycomb, fibrous or whisker-like material made of heat-resistant metal or ceramic.

[0006] Meshed or porous members made of a heat-resistant metal or ceramic material and small in heat capacity and large in surface area are between two bed plates spaced from each other. It is thus possible to increase the combustion efficiency by red-heating these members in a short time and bringing the thus red-heated members into contact with unburned gas over a wide surface area.

[0007] With the incinerator with multiple-tier beds, the meshed or porous members of each bed have larger pores or gaps than those of the immediately lower bed. A plurality of such beds may be provided one over another to reduce the height of a waste layer on each bed and thus further improve the burning efficiency.

[0008] Other features and objects of the present invention will become apparent from the following description made with reference to the accompanying drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

Fig. 1 is a vertical sectional view of an incinerator embodying the invention;

Fig. 2 is a sectional view along line II-II of Fig. 1;

Fig. 3A is a partial enlarged, vertical sectional view of the upper bed;

Fig. 3B is its plan view;

Fig. 4A is a partial enlarged, vertical sectional view of the lower bed; and

Fig. 4B is its plan view.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0010] The embodiment is described with reference to Figs. 1-4.

[0011] Figs. 1 and 2 are a front and a side view of an incinerator embodying the invention. This incinerator has a cylindrical furnace body 1, beds 2, 3 arranged in vertical tiers, chutes 4, 5 for putting wastes onto the beds 2, 3, heavy oil burners 6 for the respective beds 2, 3, an exhaust duct 7 provided at the top, a crossbar 8 near the top, and a discharge port 9 at its bottom covered with a lid 10.

[0012] As shown in Figs. 3A, 3B, 4A and 4B, each bed 2, 3 comprises an upper crossbar 11, 12 and a lower crossbar 13, 14, and numerous tangled stainless steel whiskers 15, 16 disposed in a space between the upper and lower crossbars. Similar whiskers 17 are also laid on the crossbar 8 to cover the duct 7 as a filter. When combustion starts in the incinerator, these whiskers 15, 16, 17 are heated and turn red in a short time, and come into contact with unburned gas over a wide surface area, thus markedly increasing the combustion efficiency. The whiskers 17 on the crossbar 8 supply radiant heat onto the upper bed 2, thus reducing the amount of unburned gas contained in exhaust gas.

[0013] The whiskers 15, 16, 17 may be chips produced during metal cutting. Specifically, the whiskers 15 of the upper bed 2 are coarse chips produced during heavy cutting, while the whiskers 16, 17 of the lower bed 3 and on the crossbar 8 are fine chips produced during light cutting. Thus, as wastes put on the upper bed 2 are burned and shrink to pieces smaller than the spaces between the coarse whiskers 15, they drop onto the lower bed 3. Gas permeability of the bed 2 is thus always maintained high. Unburned wastes that have fallen onto the lower bed 3 are burned there to ashes, which fall onto the bottom of the incinerator.

[0014] As shown in Fig. 1, each bed 2, 3 has a conical section so that wastes on the respective beds can be exposed sufficiently to flames of the heavy oil burners 6. The chutes 4, 5 are provided on the opposite side walls of the incinerator, diametrically opposite each other. To improve gas permeability in the incinerator, wastes are

put onto the respective beds such that they will deposit in layers of different thicknesses.

[0015] In the embodiment, stainless steel whiskers are used for the beds 2, 3 and the crossbar 8. But any other metal whiskers or meshed, porous, or honeycomb ceramic or longer-than-whisker fibrous material may be used. If a plurality of beds are provided in vertical tiers, each bed may be made from a different material from others.

[0016] The beds have a conical section in the embodiment, but they may be flat or V-shaped in section.

[0017] The incinerator of the embodiment has two fixed beds arranged in vertical tiers. But one or more than two beds may be provided in vertical tiers, or a bed or beds may be movably provided in vertical or horizontal tiers. In fact, the incinerator may of any type. The combustion type is not limited either. For example, instead of using auxiliary fuel as in the embodiment, high-temperature gas supplied from other facility may be used alone or in combination with auxiliary fuel.

[0018] As described above, according to this invention, meshed or porous members made of a heat-resistant metal or ceramic material and small in heat capacity and large in surface area are filled between two bed plates spaced from each other. It is thus possible to markedly increase the combustion efficiency by red-heating these members in a short time and bringing the thus red-heated members into contact with unburned gas over a wide surface area, and thus to reduce noxious emissions and the consumption of auxiliary fuel.

[0019] With the incinerator with multiple-tier beds, the meshed or porous members of each bed have larger pores or gaps than those of the immediately lower bed. Thus, as wastes of each bed burn and shrink in size, they will drop through the bed onto the immediately lower bed. Thus, gas permeability of each bed is always kept high, so that it is possible to completely burn wastes on each bed. No ashes will thus remain on the beds.

[0020] Since the duct at the top of the incinerator is covered by the meshed or porous members made of a heat-resistant metal or a ceramic material as a filter, it is possible to further improve the combustion efficiency by red-heating them and thus reduce the amount of unburned gas contained in exhaust gas.

rality of said beds are provided one over another.

3. The incinerator as claimed in claim 2 wherein said packing member of said each bed has larger pores or gaps than said packing member of said bed immediately below the former bed.
4. The incinerator as claimed in claim 1 wherein said exhaust duct is covered with meshed, porous, honeycomb, fibrous or whisker-like material made of a heat-resistant metal or ceramic.

Claims

1. An incinerator comprising a body, an exhaust duct, at least one bed provided in said body, said bed comprising two gas-permeable bed plates provided one over the other with a space defined therebetween, and a packing material filling said space and comprising meshed, porous, honeycomb, fibrous or whisker-like material made of heat-resistant metal or ceramic.

2. The incinerator as claimed in claim 1 wherein a plu-

FIG. 1

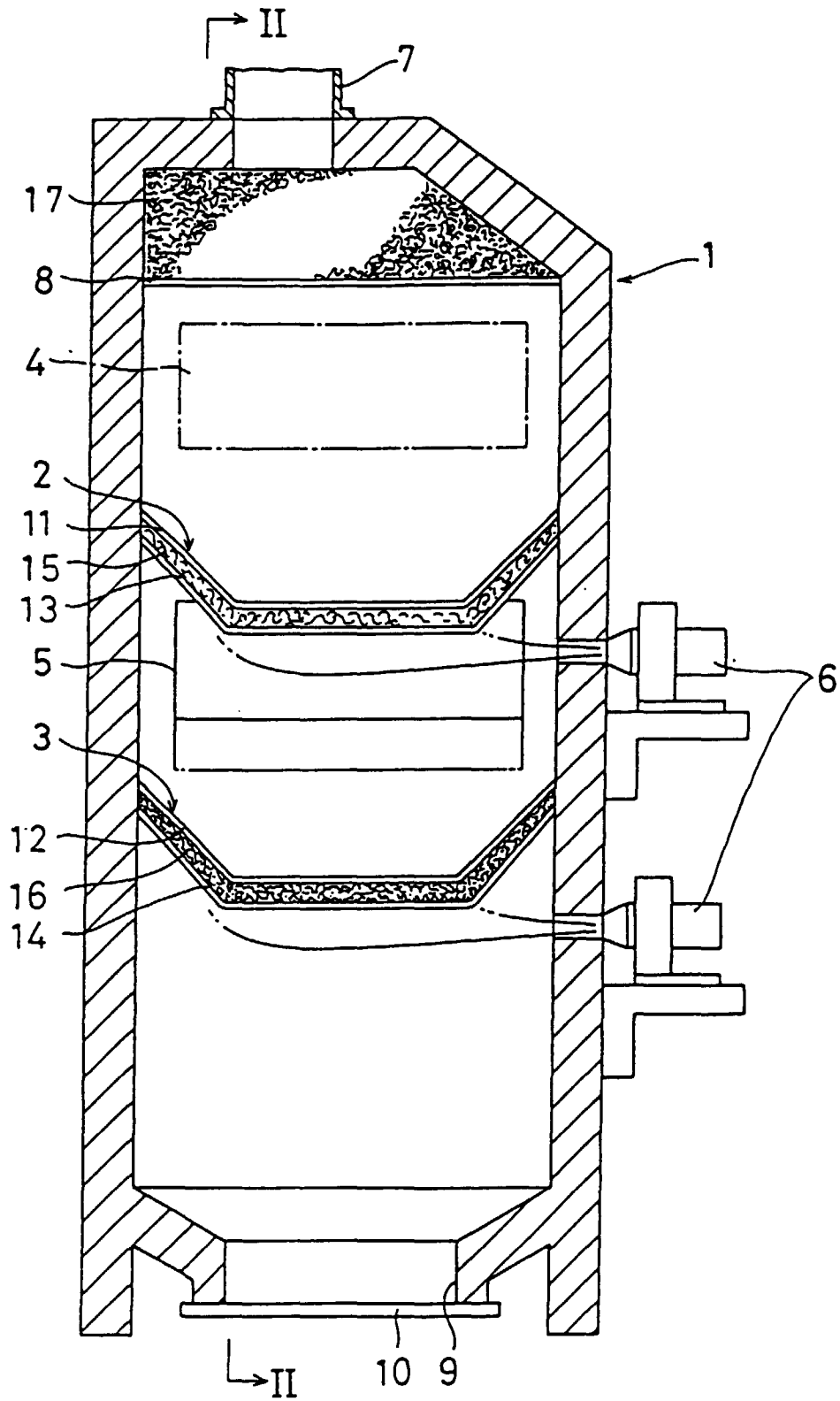


FIG. 2

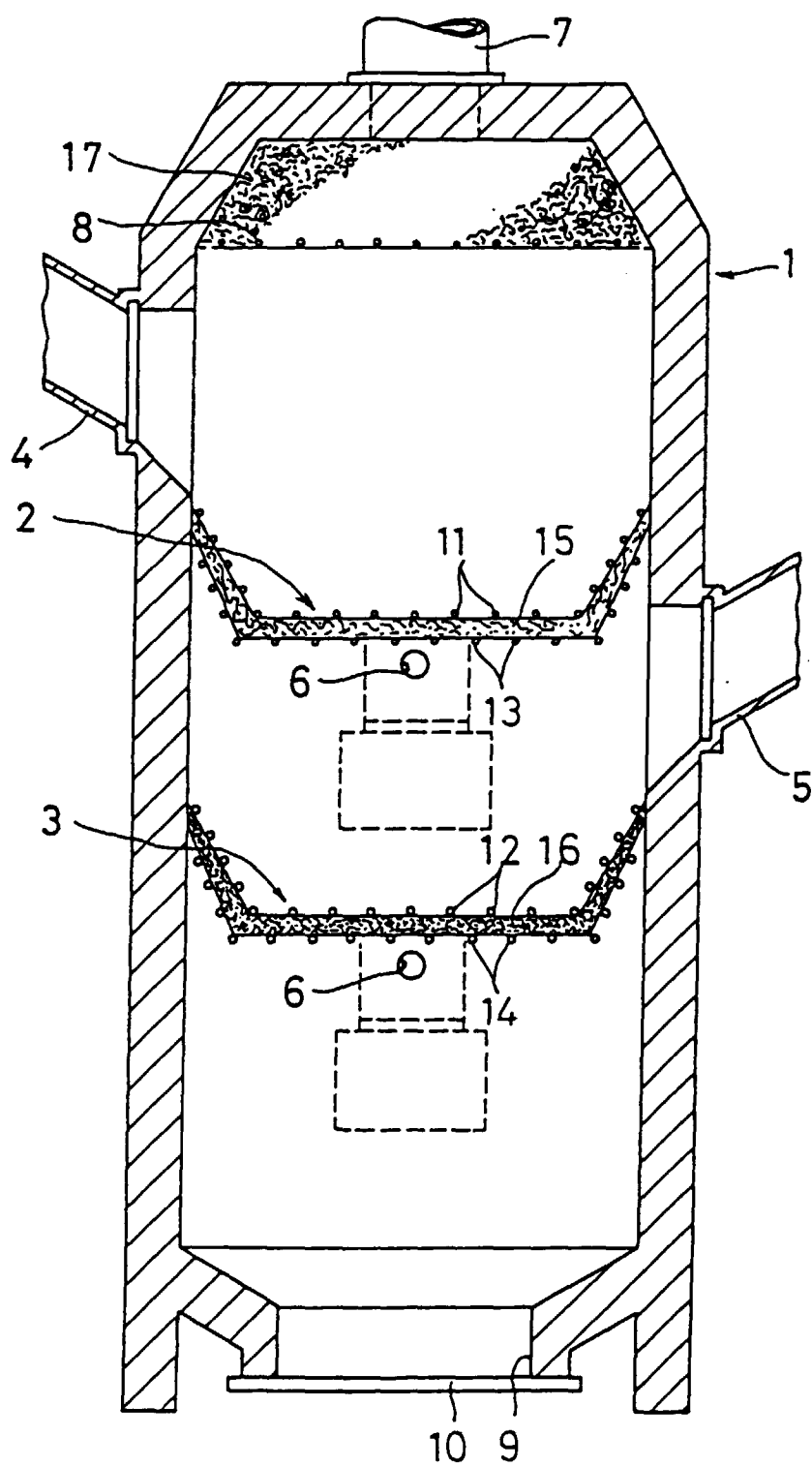


FIG. 3A

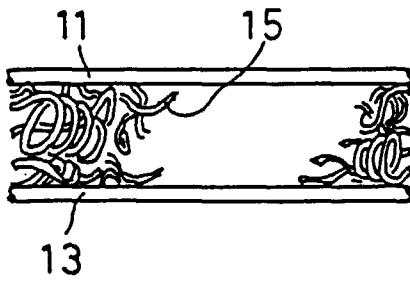


FIG. 3B

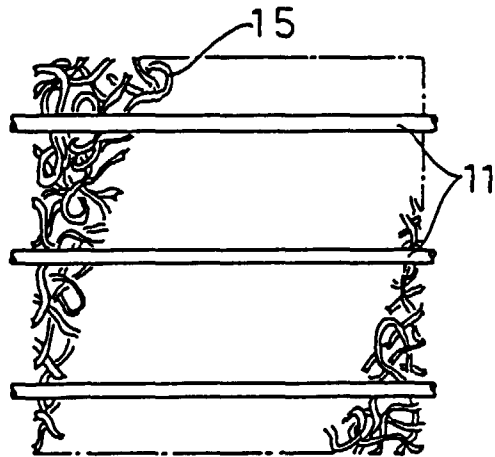


FIG. 4A

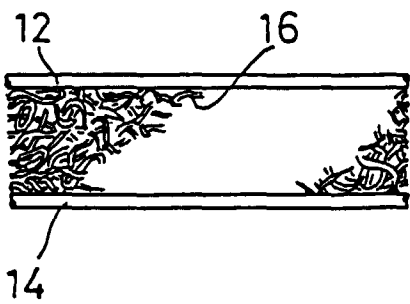


FIG. 4B

