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(71) Applicant: FLSMIDTH A/S [DK/DK]; Vigerslev Allé 77,
DK-2500 Valby (DK).(72) Inventor: OPLINGER, Ronald David; 5945 Portland
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(54) Title: ROTARY BOTTOM DISC INCINERATOR

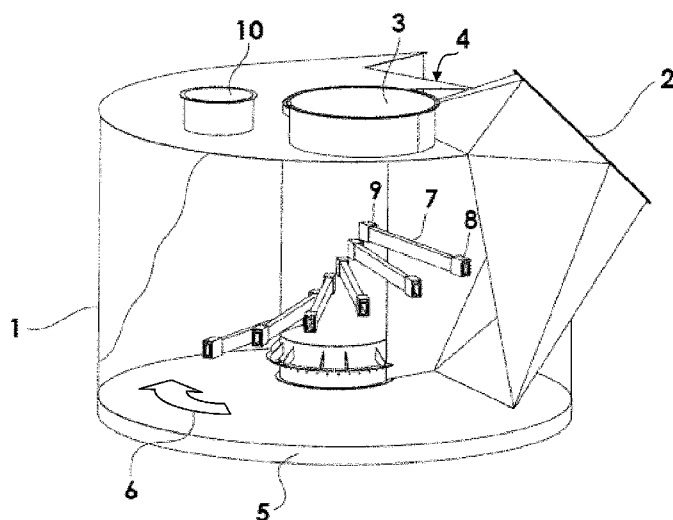


FIG. 1

(57) **Abstract:** Described is an apparatus for incineration of combustible matter, which apparatus comprises a compartment (1) for incineration of the combustible matter, an air duct (2) for supplying hot air into the compartment (1), which compartment (1) comprises an inlet (3) in its upper part for introducing the combustible matter into the compartment (1) at least partly by gravity, an outlet (4) for extracting slag and any unburned matter and a rotary disc (5) for supporting and transportation of the combustible matter, during the incineration, from the inlet (3) to the outlet (4) of the compartment (1). The apparatus is peculiar in that it comprises retaining means (7) being placed below the inlet (3) for combustible matter in a distance above the rotary disc (5) in order to prevent introduced combustible matter above a given size from falling down onto the disc (5). Hereby is obtained an apparatus which has a significant larger capacity because combustible matter with a larger size spread may be introduced and processed at the same time without compromising on the degree of burnout of especially those parts of the combustible matter having the largest particle sizes.

AN APPARATUS FOR INCINERATION OF COMBUSTIBLE MATTER

Field of the Invention

5 The present invention relates to an apparatus for incineration of combustible matter, which apparatus comprises a compartment for incineration of the combustible matter, an air duct for supplying hot air into the compartment, which compartment comprises an inlet in its upper part for introducing the combustible matter into the compartment at least partly by gravity, an outlet for extracting
10 slag and any unburned matter and a rotary disc for supporting and transportation of the combustible matter, during the incineration, from the inlet to the outlet of the compartment.

Non-limiting examples of combustible matter include, besides from fossil fuel like
15 coal, tyres, furniture, carpets, wood refuse, garden waste, kitchen waste, paper sludge, sewage sludge and bleaching earth.

Background

20 An apparatus of the above mentioned kind is known from EP 1200778, which is owned by the applicant of the present invention. In actual practice, a number of limitations have been ascertained in relation to this know apparatus. Because the residence time, in which the combustible matter is in the compartment, is determined by the rotation speed of the disc, the size range of the material,
25 which is introduced over a given period into the compartment, is rather narrow, if substantially complete incineration of combustible matter should be obtained. This may further influence on the capacity of the apparatus, as the rotation speed should be selected for the combustible matter, which requires the longest residence time. Further, compactable combustible matter has a tendency to
30 remain stagnant on the disc, thus being not exposed to the required heat and/or oxygen to obtain complete incineration before it reaches the outlet of the compartment.

It is the object of the present invention to provide an apparatus for incineration of combustible matter by which the aforementioned disadvantages are remedied or significantly reduced.

5

Summary

According to the present invention this is obtained by an apparatus of the kind mentioned in the introduction, being characterized in that it comprises retaining
10 means being placed below the inlet for combustible matter in a distance above the rotary disc in order to prevent introduced combustible matter above a given size from falling down onto the disc.

Hereby is obtained an apparatus which has a significant larger capacity because
15 combustible matter with a larger size spread may be introduced and processed at the same time without compromising on the degree of burnout of especially those parts of the combustible matter having the largest particle sizes. This is due to the fact that, as the combustible matter enters the compartment at its upper part, the smaller particles are allowed to pass by the retaining means and
20 fall down to the rotary disc, whereas the larger particles, such as whole tires etc., are retained by the retaining means, thus a faster and more complete burnout of these larger particles are obtained. As the larger particles burn off the remaining pieces may fall down onto the disc when they are small enough to pass the retaining means. Further, the resulting bed of combustible matter on the rotary
25 disc is less compact which allows for a more complete combustion of the smaller particles as well. Thus, generally, the apparatus according to the invention allows for more efficient use of the internal volume of the compartment.

The retaining means may in principle be constituted of any suitable means that
30 act as a sieve in order to retain particles above a given size while allowing smaller particles to pass and fall down onto the disc. Thus, the retaining means may comprise a kind of a grate or a number of wires, which are mounted inside

the compartment below the inlet for combustible matter. However, in a preferred embodiment the retaining means comprise a number of tubes.

The retaining means are exposed to a dusty and a high temperature environment, hence it is preferred that they are made of a high temperature
5 corrosion resistant alloy, such as HR-160[®] marketed by Haynes International, Inc. or the somewhat cheaper 253MA[®] marketed by Avesta Welding.

In case the retaining means comprise a number of tubes, said tubes may be mounted radially relative to the disc with a distance there between. In this way
10 the distance between the tubes increases in the direction away from the center of the disc. The tube may as an alternative be mounted parallel to each other with a certain distance there between. In this way the distance between the tubes is the same over the entire length of the tubes, which may be an advantage in some situations.

15 Further, the retaining means may vertically be mounted in the same or different distances from the rotary disc, thus describing a horizontal or an inclined surface, respectively, or they may be mounted in a way that permits adjustment between a horizontal and an inclined surface.

20 In case the retaining means comprise a number of tubes, said tubes may be mounted in a descending arrangement, which enabling gradually movement of the larger combustible matter particles towards the rotary disc.

25 Further, it is preferred that the tubes are mounted in a way that enables removal and/or replacement of these during operation of the apparatus. This may be realized by providing openings in a side wall of the compartment and corresponding mounting boxes placed radially inside the compartment close to the center thereof, where the cross section of both the openings and mounting
30 boxes is adapted to a selected cross section of the tubes.

In addition, the retaining means may be subject to cooling by proper means, preferably arranged inside the retaining means.

5 **Brief description of the drawings**

The invention will now be explained in further details with reference to the drawing, being diagrammatical, and with its only figure showing an apparatus according to the invention.

10

Detailed description

In the figure is seen an apparatus for incineration of combustible matter. The shown apparatus comprises a compartment 1 for incineration of the combustible matter and an air duct 2 for supplying hot air into the compartment 1. The compartment 1 comprises an inlet 3 in its upper part for introducing the combustible matter into the compartment, an outlet 4 for extracting slag and any unburned matter and a rotary disc 5 for supporting and transportation of the combustible matter, during the incineration, from the inlet 3 to the outlet 4 of the compartment, as indicated by the arrow 6.

Further, the shown apparatus comprises six tubes 7, which are mounted below the inlet for 3 combustible matter. The tubes 7 are placed radially relative to the disc 5 with an outwardly increasing distance there between, hence preventing introduced combustible matter above a given size from falling down onto the disc 5 while allowing smaller particles to pass and fall down onto the rotary disc 5. In this way, the larger particles, which are retained by the tubes 7, will burn faster, thus ensuring a more complete burnout of these. In addition, the bed on the rotary disc 5, consisting of smaller particles of combustible matter and residues, which have fallen down from the tubes 7, is less compact, which allows for a more complete combustion of the smaller particles as well. Hereby is obtained an apparatus which has a significant larger capacity because combustible matter

with a larger size spread may be introduced and processed at the same time without compromising on the degree of burnout of especially those parts of the combustible matter having the largest particle sizes.

- 5 In the shown embodiment the tubes 7 are placed in different distances above the disc 5, hence providing a descending surface, which enabling gradually movement of the larger combustible matter particles towards the rotary disc 5.

10 Further, the apparatus comprises six openings 8 in a side wall of the compartment 1 and corresponding mounting boxes 9, which are placed radially inside the compartment 1 close to the center thereof. The cross section of both the openings 8 and mounting boxes 9 corresponds substantially to the cross section of the tubes 7. In this way, the tubes 7 may be removed and/or replaced during operation of the apparatus.

15

The shown apparatus also comprises an inlet 10 for introducing a pulverulent or particulate mineral material into the compartment 1 in order to control the temperature inside the compartment.

20

Claims

1. Apparatus for incineration of combustible matter, which apparatus comprises a compartment (1) for incineration of the combustible matter, an air duct (2) for supplying hot air into the compartment (1), which compartment (1) comprises an inlet (3) in its upper part for introducing the combustible matter into the compartment (1) at least partly by gravity, an outlet (4) for extracting slag and any unburned matter and a rotary disc (5) for supporting and transportation of the combustible matter, during the incineration, from the inlet (3) to the outlet (4) of the compartment (1), **characterized in** that that it comprises retaining means (7) being placed below the inlet (3) for combustible matter in a distance above the rotary disc (5) in order to prevent introduced combustible matter above a given size from falling down onto the disc (5).
2. Apparatus according to claim 1, **characterized in** that the retaining means (7) comprise a number of tubes (7).
3. Apparatus according to claim 2, **characterized in** that the tubes (7) are mounted radially relative to the disc (5) with a distance there between.
4. Apparatus according to claim 2, **characterized in** that the tubes (7) are mounted parallel to each other with a certain distance there between.
5. Apparatus according to claim 2, **characterized in** that the tubes (7) are mounted in a descending arrangement.
6. Apparatus according to claim 2, **characterized in** that the tubes are mounted in way that enables removal and/or replacement of these during operation of the apparatus.
7. Apparatus according to claim 1, **characterized in** that the retaining means (7) vertically are mounted in the same distance from the rotary disc (5).

8. Apparatus according to claim 1, **characterized in** that the retaining means (7) vertically are mounted in different distances from the rotary disc (5).

5 9. Apparatus according to claim 1, **characterized in** that it comprises means for cooling the retaining means (7).

10. Apparatus according to claim 9, **characterized in** that the cooling means are arranged inside the retaining means (7).

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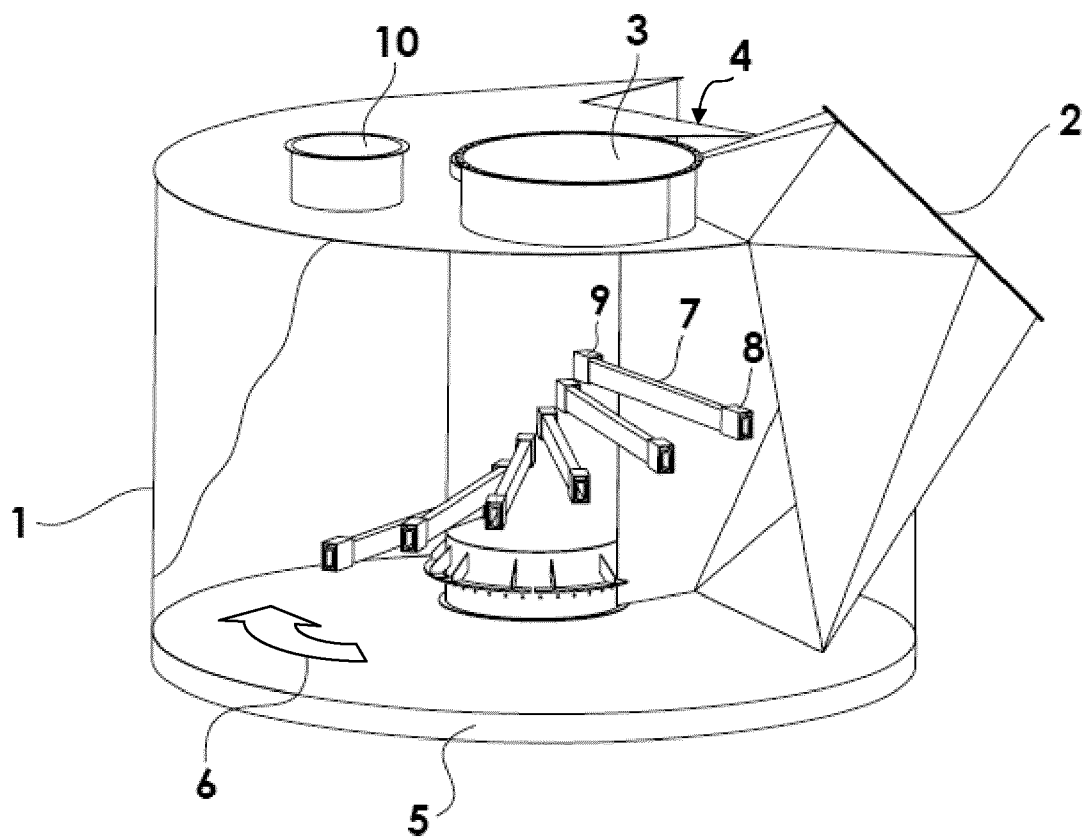


FIG. 1

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER

INV. C04B7/44 F23G5/26 F23H3/02 F23H5/00 F23H7/04
F27B7/20
ADD. F27D99/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F23G F23H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP S49 114770 U (N.N.) 1 October 1974 (1974-10-01)	1,2,4,7
Y	figures 1-4	5
X	----- CN 100 445 638 C (ZHANG WEITIAN [CN] WEITIAN ZHANG [CN]) 24 December 2008 (2008-12-24) figure 5	1,7
Y	----- FR 2 614 394 A1 (IDEE SARL [FR]) 28 October 1988 (1988-10-28)	5
A	page 1, lines 1-20 page 2, lines 20-27 page 6, line 37 - page 8, line 27 claims 1, 9; figures 1-4, 9 -----	1



Further documents are listed in the continuation of Box C.



See patent family annex.

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European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Vogl, Paul

INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP S49114770 U	01-10-1974	JP S53955 Y2 JP S49114770 U	12-01-1978 01-10-1974
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