

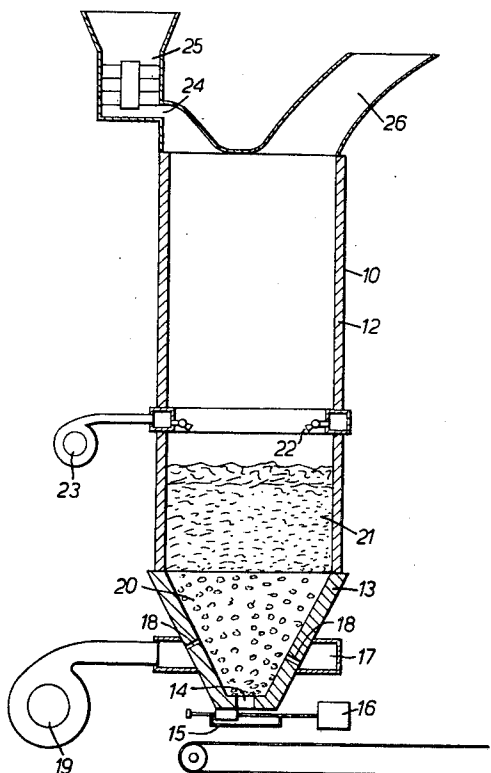
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 [31] **22,424/68**

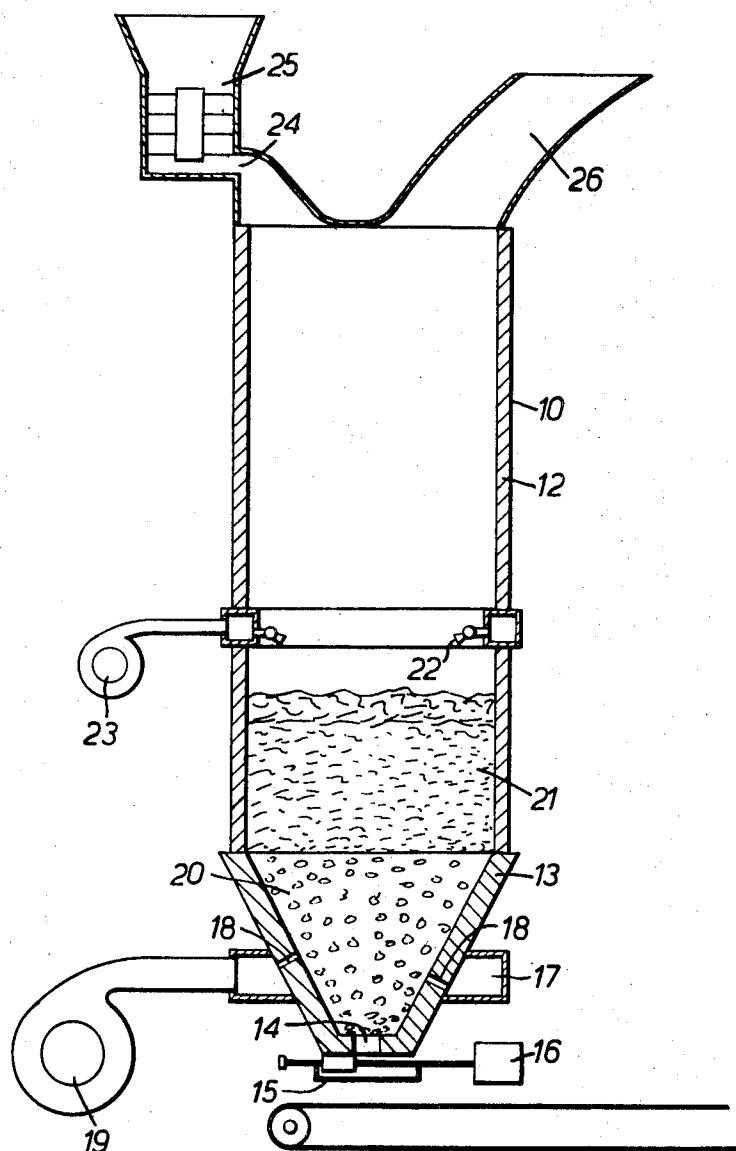
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[54] **INCINERATORS**
8 Claims, 1 Drawing Fig.

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110/165
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 [50] Field of Search **110/7, 8,**
165

ABSTRACT: In a method of disposing of town refuse the refuse is burnt in an incinerator whilst supported on a non-fluidized mass of refractory granular material and the granular material is periodically fluidized to allow the noncombustible content of the refuse to pass therethrough and be removed from the incinerator through an outlet. The mass of refractory granular material serves as a valve for permitting the noncombustible content of the refuse which collects on the surface of the granular material to pass therethrough and be removed from the incinerator.





INCINERATORS

This invention relates to a method of disposing of town refuse by burning it in an incinerator and to incinerators suitable for burning town refuse.

Until recently town refuse has been disposed of mainly by tipping into worked-out quarries and mineshafts. As the number of sites suitable for tipping has gradually diminished and the quantity of refuse to be disposed of has increased, the disposal of town refuse has become an increasingly important problem to Local Authorities. The calorific value of town refuse has however increased due mainly to an increase in the use of disposable combustible materials for packaging purposes and a number of proposals have been put forward for burning the refuse in incinerators. Conventional incinerators usually have some form of travelling grate which supports the refuse and keeps it moving in the incinerator so that the combustible material can be completely burnt. Town refuse contains some noncombustible material and unless care is taken, this noncombustible material can quickly build up and clog the travelling grate and also prevent an adequate air supply from reaching the combustible material from beneath the grate.

According to the first aspect of the present invention in a method of disposing of town refuse, the refuse is deposited into an incinerator and the combustible content of the refuse is burnt whilst separated from an outlet from the incinerator by a mass of refractory granular material and said granular material is periodically fluidized to allow the noncombustible content of the refuse to pass therethrough and be removed from the incinerator through said outlet.

The mass of refractory granular material is conveniently fluidized by passing air therethrough.

When the mass of granular material is fluidized the noncombustible content of the refuse is flushed out through the outlet by the flow of said granular material therethrough. The mass of refractory granular material in the bed then has to be restored to its original mass by adding granular material into the incinerator.

According to a second aspect of the present invention an incinerator for burning town refuse comprises a container having a bed of refractory granular material therein, an opening in the wall of the container above the level of the surface of the bed through which town refuse is introduced into the container, means for introducing air into the container above the level of the surface of the bed to support combustion of the combustible content of the refuse, means for periodically passing a gaseous medium through the bed from below to fluidize the bed and an opening in the wall of the container below the level of the surface of the bed through which the noncombustible content of the refuse can periodically be removed from the container.

Since there are no moving parts in the incinerator which correspond to the travelling grate in a conventional incinerator the noncombustible content of the refuse cannot clog the moving parts and when the noncombustible content of the refuse has built up in the incinerator the mass of refractory granular material is fluidized to flush out the noncombustible content from the container.

When the incinerator is in use, heat developed from the burning refuse may be used to dry and burn slurries, for example of sewage sludge, injected into the incinerator. Alternatively, or in addition, some of the heat developed in the incinerator may be absorbed by waste heat recovery equipment such as a boiler or heat exchanger.

An incinerator in accordance with one embodiment of the invention has a container which is of tubular form and is arranged with its longitudinal axis vertical. The bed of refractory granular material is supported on a layer of noncompactible, noncombustible bodies arranged in an inverted frustoconical base of the container. The town refuse is burnt while supported on the surface of the bed of granular material which is not fluidized and when the combustible content of the refuse has been burnt the noncombustible material is allowed to fall through the bed to the base of the container by fluidizing the

bed by means of a gaseous medium such as air or steam passed through the bed. The fluidized bed thus serves as a valve for removing the noncombustible content of the refuse which would otherwise collect on the surface of the bed of granular material. The bodies of noncompactible, noncombustible materials at the base of the container form a distributor for the gaseous medium which is passed into the container through a plurality of openings in the base thereof.

After the noncombustible part of the refuse has been flushed out of the container it is necessary to add more granular material to the bed to restore it to its original depth.

In order that the invention may be more readily understood it will now be described, by way of example only, with reference to the accompanying drawing which is a sectional side elevation of an incinerator in accordance with one embodiment of the invention.

An incinerator for town refuse comprises a container 10 conveniently of cylindrical form having its longitudinal axis vertical and a lining 12 of solid refractory material. The base 13 of the container is of inverted frustoconical form and the lower surface of the base includes an opening 14 which can be closed off by means of a sliding plate 15 actuated by mechanical or hydraulic means 16. A duct 17 is secured to the outer surface of the base 13 of the container and the interior of the duct is in communication with the interior of the container through a plurality of passageways 18. A fan or blower 19 is connected to the duct 17 to force a gaseous medium such as air or steam into the container through the passageways 18. The interior of the base portion 13 of the container is filled with noncompactible bodies 20 of noncombustible material such as pieces of irregular-shaped metal, glass bottles and the like, and a bed 21 several feet thick of granular refractory material such as sand, pulverized ash or alumina is supported on the bodies 20. A plurality of nozzles 22 located in the container above the surface of the bed are fed with air under pressure by means of a fan or blower 23 positioned outside of the container. The outlets of the jets are directed towards the surface of the bed. At the upper end of the container there is an opening 24 through which the town refuse is introduced into the incinerator. If desired the refuse may be shredded in a shredder 25 prior to being introduced into the container. Also at the upper end of the container there is a passage 26 leading to a gas-cleaning system and a smoke stack, neither of which are shown.

The incinerator is operated as follows: air is introduced into the container through the nozzles 22 and a suitable fuel has to be introduced into the incinerator with the first load of refuse in order to ignite the refuse but thereafter the combustible material in the refuse will ignite spontaneously as it is deposited onto the bed 21 and the supply of fuel to the incinerator can be stopped. The town refuse is burnt while supported on the surface of the bed 21 of granular refractory material which is not fluidized and when the combustible material has been burnt the noncombustible material is allowed to fall through the bed to the base of the container by fluidizing the bed by means of air or steam passed through the bed from the fan 19. The fluidized bed thus serves as a valve for removing the noncombustible materials which otherwise collect on the surface of the bed. The bodies of noncombustible material 20 at the base of the container form a distributor for the air or steam which is passed into the container through the openings 18.

In order that the surface of the bed 21 should remain at a substantially constant level below the nozzles 22 it is necessary to periodically remove some of the noncombustible material from the base of the container and this may be brought about automatically by means of temperature- or pressure-sensitive sensors (not shown) fitted to the sidewalls of the container in the vicinity of the proposed surface of the bed. The sensors are arranged in two groups, one above and one below the level of the proposed surface and if the surface of the bed rises or falls beyond a predetermined limit, the difference in temperature or pressure of the two groups will be correspondingly changed.

and the difference in the output signals from the two groups of sensors is used either to control the energization of the device 16 for sliding the plate 15 away from the opening 14 at the bottom of the container or to control the rate at which town refuse is introduced into the container.

We claim:

1. A method of disposing of refuse which comprises the steps of providing a mass of nonfluidized refractory granular material above a closeable opening in the base of an incinerator, depositing an initial load of refuse onto the mass of granular material in the incinerator, igniting and burning the combustible content of said refuse while supported on the granular material, introducing further refuse into the incinerator and burning said further refuse while supported on the granular material, periodically fluidizing said mass of granular material to allow the noncombustible content of the refuse to pass therethrough to a position adjacent to said closeable opening, and periodically removing said noncombustible content of the refuse through said opening.

2. A method of disposing of refuse as claimed in claim 1 in which said mass of refractory granular material is fluidized by passing air therethrough.

3. A method of disposing of refuse as claimed in claim 1 in which the opening is opened and the granular material is fluidized simultaneously so that the granular material flushes the noncombustible content of the refuse through said opening.

4. An incinerator for burning refuse comprising a container which defines a first opening in the lower part thereof, movable means for closing said opening, a layer of noncompactible, noncombustible bodies in the container extending to a level above the level of said opening, a bed of refractory granular material in the container and supported on said layer, a second opening defined by said container above the level of the surface of the bed through which refuse is introducible into the container, means for introducing air into the container above the level of the surface of the bed to support combustion of the combustible content of the refuse, and means for passing a gaseous medium through said layer of noncombustible bodies into the bed to fluidize the bed.

5. An incinerator as claimed in claim 4 comprises means for shredding the refuse prior to it being introduced into the container.

6. An incinerator as claimed in claim 4 in which the refractory granular material is alumina.

7. An incinerator as claimed in claim 4 in which the container is of tubular form and is arranged with its longitudinal axis vertical.

8. An incinerator as claimed in claim 4 in which the base of the container defines said first opening and is of inverted frustoconical form and the noncompactible, noncombustible bodies are arranged in the base of the container.

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