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[54] INCINERATOR EMISSIONS
REDUCTION SYSTEM

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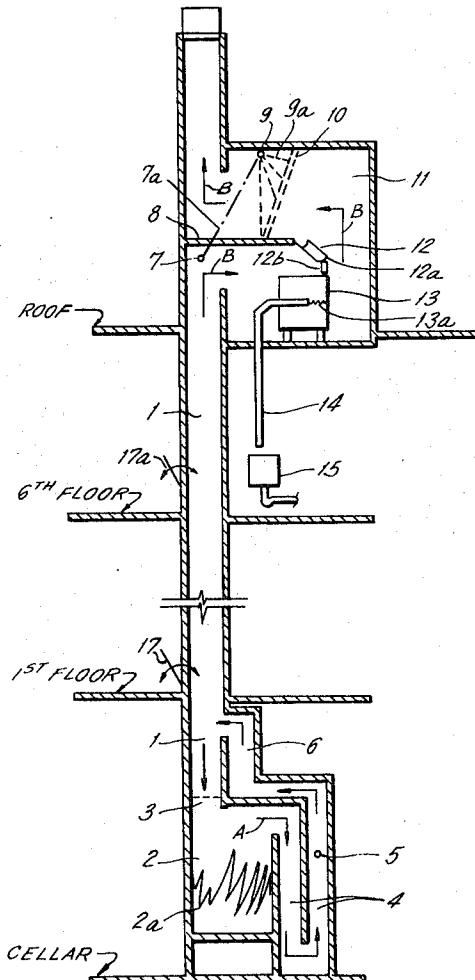
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[57]

ABSTRACT

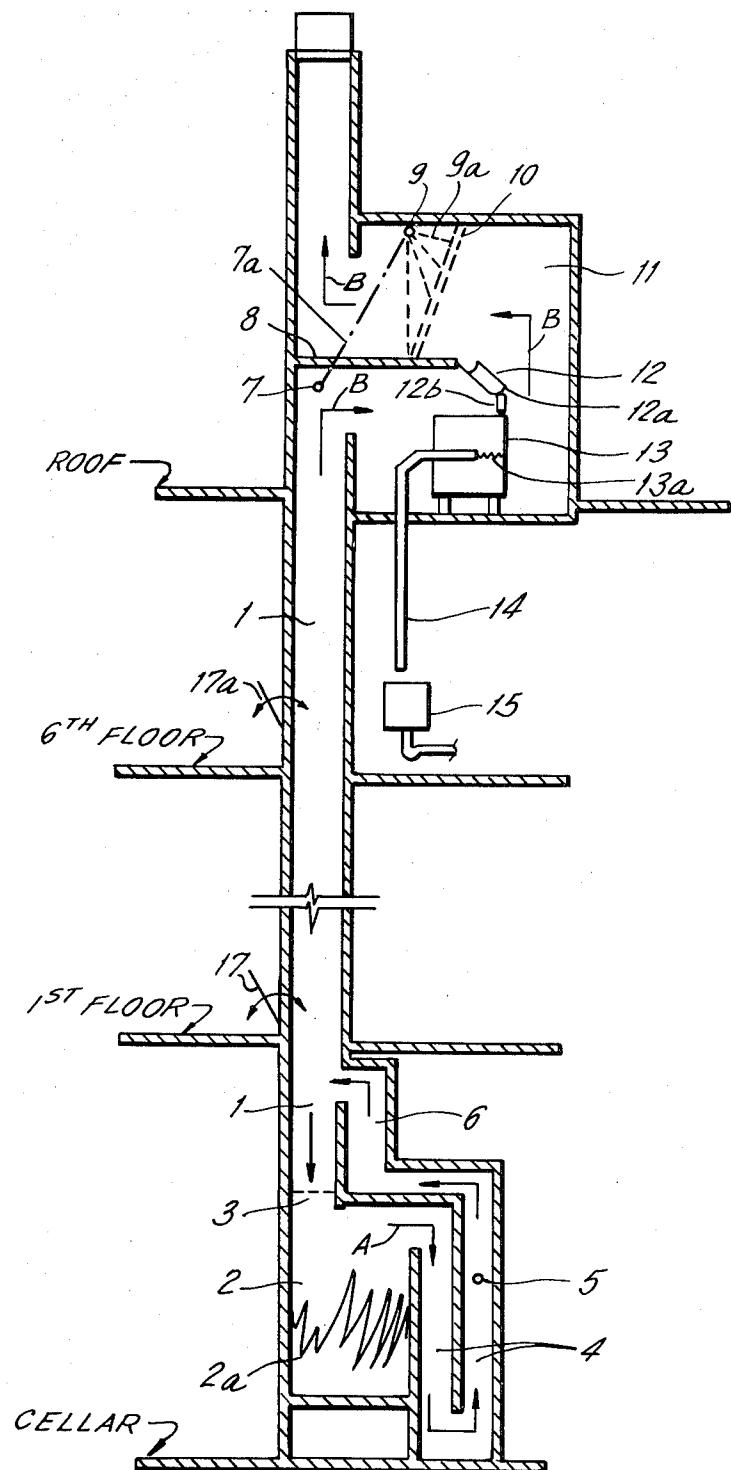
A system for upgrading the quality of pollution control within incinerators in which particulate emission is significantly reduced through automatic wet scrubbing of the smoke to remove particulate and other harmful material before emission of the smoke into the air. The system operates automatically in the presence of smoke and is self-cleaning.

1 Claim, 1 Drawing Figure



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INCINERATOR EMISSIONS REDUCTION SYSTEM

The present invention relates to incinerators and more particularly to a novel scrubber for use in incinerator systems which operates under control of automatic means and is substantially self-cleaning.

The primary concern of the present invention is the reduction of pollution in the air we breathe as a result of inefficient incinerators.

The invention provides a method and apparatus for scrubbing incinerator gases in an economical manner and having few moving parts so as to provide a high quality and yet simple and reliable structure.

Conventional reduction and emission control systems incorporate a multitude of controls and components to achieve a completely automated burning cycle. The nature of such present day structures is so complicated that any breakdown, in so much as any minor component contained therein, requires a complex and tedious procedure before the system can be put back "on line", thereby significantly increasing the cost of design, assembly, maintenance, and operation.

The present invention is characterized by providing a system which effectively reduces particulate and other undesirable material from incinerator emissions, while doing so in a simple straightforward and highly reliable manner.

The present invention is comprised of barrier means within the exiting flue for constraining the emitted particulate bearing emission to flow in a tortuous path. Automatic smoke detector means are provided in the neighborhood of the barrier for selectively energizing a water spraying device to emit a fine water spray upon a porous barrier, only in the presence of an emission. The emission, in passing through the porous barrier, is thoroughly washed, causing particulate to be removed therefrom through the combined cooperation of the porous material and the film of water sprayed upon one surface of the barrier. Particulate so removed from the emission is carried together with the water into a collection device where it may be simply and easily removed. The water spray serves the further function of continuously washing the porous barrier so as to provide a substantially self-cleaning system.

It is therefore one object of the present invention to provide a novel emission reduction structure for use in incinerators and the like, in which a porous barrier and film of water associated therewith, are utilized to remove particulate from an incinerator emission and performing the dual function of self-cleaning of the system.

This as well as other objects of the present invention will become apparent when reading the accompanying description and drawings in which the sole FIGURE shows an incinerator system incorporating the principals of the present invention.

The incinerator system 10, as shown in the sole FIGURE, may for example, be installed within a multi-floor building such as an apartment house. The drawing shows a schematic flow diagram of the progress of emissions from a primary combustion chamber provided in the lowest level thereof to the point where the emission enters into the atmosphere.

Occupants of the building may drop their waste and garbage into a chute-flue 1, through suitable hingedly mounted doors 17, which are preferably biased (by means not shown) to remain in a normally closed position.

The refuse drops downwardly, by gravity, into a primary combustion chamber 2 where the flames or heat source 2A, burns the refuse.

During combustion, the charging flue gate 3 is moved to the closed position. The combustion gases follow the path indicated by arrow A into a tortuous shaped secondary chamber 4. The combustion gases pass a gas fired after burner 5, located within a portion of the tortuous shaped chamber, to burn and thereby reduce the fly ash content within the combustion emission. The combustion gases continue substantially in the upward vertical direction, where they pass through a by-pass chamber section 6 and enter into the main flue 1.

The combustion gases continue to move vertically upward until they reach a barrier plate 8 which constrains the gases to move along a tortuous path as indicated by the arrows B. An automatic smoke detector device 7 is located beneath the underside of barrier plate 8, so as to be directly in the path of movement of the combustion gases. The smoke detector 7 is coupled to a water spray device, the connection being designated by phantom line 7a. The water spray device 25 has a spray head 9 whose valve (not shown) is operated under control of the smoke detector device so as to permit the passage of water through the valve mechanism and thereby emit a water spray 9a upon one surface of a porous barrier member 10. The porous barrier member 10 may preferably be a screen, diagonally positioned within chamber 11, so as to cause any emissions directed toward the porous barrier to be constrained to pass therethrough. The water spray device 9, when actuated by the automatic smoke detector device 7, in the presence of an incinerator emission, provides a film of water which covers one surface of the porous barrier 10, whereby the porous barrier and water film, jointly cooperate to wash particulate from the emission. The particulate is caused to be washed downwardly and to collect upon the upper surface of barrier 8 which is preferably slightly inclined so as to cause the particulate bearing water to collect within a trough 12. Trough 12 is also further preferably inclined from one end to the other to cause the water collected therein to drop by gravity to its lower end through a downspout 12b, which is positioned above a liquid refuse container 13. An overflow pipe 14 is positioned approximately half-way up the vertical side of the liquid refuse container 13 to permit the water reaching the intermediate level 13a to run off through pipe 14 and be collected within a second container 15 provided at a lower floor.

The wetted down pollutants are caused to settle at 55 the bottom of container 13 and may be periodically collected therefrom.

The water film and screen jointly cooperate to remove the harmful components carried by the gaseous emission while at the same time providing a unique arrangement for self-cleaning of the system.

Although there has been described a preferred embodiment of this novel invention, many variations and modifications will now be apparent to those skilled in the art. Therefore, this invention is to be limited, not by the specific disclosure herein, but only by the appending claims.

I claim:

1. Apparatus for removal of particulate and other polluting material from an incinerator emission comprising:

a flue having an inlet and an outlet for carrying the combustion gases from its inlet, which gases are emitted from an incinerator, to the outlet thereof, whereby the emission may enter into the atmosphere;

an enlarged chamber coupled between the inlet and outlet of said flue to permit the passage of gases therethrough;

a barrier plate being provided within said flue and extending from one wall of said enlarged chamber and aligned substantially transverse to the path of movement of exiting gases through said flue for causing exiting gases to move around said barrier plate;

porous barrier means positioned upon said barrier plate near the outlet end of said enlarged chamber, to occupy and fill the entire space defined by said

outlet end and said barrier plate for constraining gaseous emissions passing therethrough in moving toward the outlet of said flue, said porous barrier means being aligned at an angle to the vertical direction;

means positioned near the outlet end of said enlarged chamber for spraying the exit surface of said porous barrier means to provide a substantially constant film of water thereon, whereby said porous barrier and said film of water cooperate to wash particulate and other noxious elements from the gaseous emission before exiting from the outlet end of said flue;

smoke detector means positioned beneath said barrier plate and near the inlet end of said enlarged chamber, for selectively operating said means for providing a water spray to emit water when said detector detects the presence of smoke.

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