International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 06 Issue: 03 | Mar 2019 www.irjet.net p-ISSN: 2395-0072

CARBON PARTICLES REMOVING IN EXHAUST GASES

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Abstract: *If a high pressure burned gases were allow to atmosphere directly form exhaust manifold, a loud unpleasant noise heard like firing of gum. This noise is due to the large difference in pressure between exhaust gas and atmosphere, so to decrease the noise a device is connected between tail pipe called "chimney". Silencers of different types are used by automotive vehicle. In some design the outer shell is made oval is shape. This permit adequate clearance with the ground when installed beneath a chimney. The outer shell of muffler putted with tin alloy or aluminum to resist corrosion used by exhaust a gas condensate. To drain the condensate a small drain hole provided in the outer shell.*

KeyWords: **High pressure burned gases, exhaust manifold, chimney, corrosion.**

1.Introduction

A device for removing fine carbon particles from exhaust gas emitted by automobile diesel engines or the like thereby to clean the exhaust gas. The device incorporates a filter for collecting fine carbon particles suspended by the exhaust gas. After a predetermined amount of fine carbon particles is accumulated on the filter, the carbon particles are burnt to regenerate the filter. The detection of amount of carbon particles accumulated on the filter is made through the detection of the fuel consumption of the engine or the differential pressure across the filter. The exhaust gas cleaning device employing a filter has a drawback that the filter is liable to be clogged with carbon particles, while the device incorporating a cyclone cannot completely collect the carbon particles because the latter has light small size. In the exhaust gas cleaning system in which the collected carbon particles are burnt by the heat possessed by the exhaust gas, it is essential that the exhaust gas temperature be as high as 600° C. In the normal running of automobiles around streets, however, there is almost no condition which would raise the exhaust gas temperature to such a high level as 600° C. or higher. Therefore, the collected carbon particles are burned incompletely, causing clogging of the filter.

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Silencers of different types are used by automotive vehicle. In some design the outer shell is made oval is shape. This permit adequate clearance with the ground when installed beneath. The outer shell of muffler putted with tin alloy or aluminum to resist corrosion used by exhaust a gas condensate. To drain the

condensate a small drain hole provided in the outer shell.

2. Literature Review

Mercury emission from a flue gas such as that generated by a coal fired power plant is controlled by injecting into the flue gas unburned carbon purified from ash such as fly ash or wood ash. The unburned carbon adsorbs the mercury and is later removed from the flue gas by a particle separator. The unburned carbon collected from ash is significantly lower in cost compared to activated carbon presently used in such a process. The unburned carbon is concentrated in the sorbent by one or more separation processes used to remove non-carbon particles from the fly ash.

These processes include gravity separation, electrostatic separation, froth flotation, magnetic separation and size classification. Mercury adsorption is further increased by oxidation of the carbon surface.

A method of removing mercury vapor from a stream of flue gas utilizing unburned carbon collected from ash comprising the steps of:

preparing a carbon sorbent from ash by separating a portion of the non-carbon particles from the ash resulting in a sorbent having a greater concentration of unburned carbon than the original ash;

subsequently introducing the carbon sorbent into a flue gas stream whereby mercury in the flue gas stream is adsorbed by the unburned carbon in the sorbent; and

subsequently collecting the mercury-laden carbon sorbent from the flue gas stream.

Mercury has long been known as a potential health and environmental hazard. Environmental standards for its emissions from coal fired power plants, petroleum and chemical refineries, incinerators, metal extraction operations, and other mercury emitting facilities are becoming increasingly demanding. New regulations are currently under development to reduce the permissible levels of mercury emissions from such facilities. Technologies are under development to meet this challenge. One such technology utilizes activated carbon to control mercury emissions from coal fired power plants. However, cost estimates show that commercialization of this technology would result in a five percent increase in electricity prices and that 95 percent of this increase is due to the cost of activated carbon.

A minimum solid-to-gas ratio is usually required to ensure the adsorbate molecules, mercury in this case, in the gas phase have a reasonable chance to collide with adsorbent particles.Compared with activated carbon, unburned carbon is generally low cost with a reasonable adsorptive capacity. Unburned carbon has more macro-pores, which allows the fast adsorption and easy regeneration after loaded. Moreover, the trace and minor elements or compounds present in the unburned carbons may enhance the adsorption of mercury.

The primary use of unburned carbon to remove mercury is in the flue gas from coal-fired power plants. However, it can be used to remove mercury from incineration flue gas, natural gas and the ventilation air from chloralkali processes. Further objects, features and advantages of the invention will become apparent

from a consideration of the following description and the appended claims when taken in connection with the accompanying drawings

3. Construction

3.1 Construction

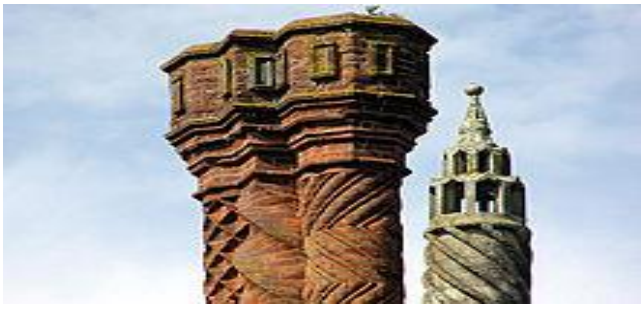

Fig 3.1: Carved brick chimneys characteristic of late Gothic Tudorbuildings, at Thornbury Castle, 1514

As a result of the limited ability to handle transverse loads with brick, chimneys in houses were often built in a "stack", with a fireplace on each floor of the house sharing a single chimney, often with such a stack at the front and back of the house. Today's central heating systems have made chimney placement less critical, and the use of non-structural gas vent pipe allows a flue gas conduit to be installed around obstructions and through walls.

In fact, most modern high-efficiency heating appliances do not require a chimney. Such appliances are generally installed near an external wall, and a noncombustible wall thimble allows a vent pipe to run directly through the external wall.

3.2 Residential flue liners

A flue liner is a secondary barrier in a chimney that protects the masonry from the acidic products of combustion, helps prevent flue gas from entering the house, and reduces the size of an oversized flue. Since the 1950s, building codes in many locations require newly built chimneys to have a flue liner. Chimneys built without a liner can usually have a liner added, but the type of liner needs to match the type of appliance it services. Flue liners may be clay or concrete tile, metal, or poured in place concrete.

3.3 Chimney Pots, Caps And Tops

A chimney pot is placed on top of the chimney to expand the length of the chimney inexpensively, and to improve the chimney's draft. A chimney with more than one pot on it indicates that multiple fireplaces on different floors share the chimney.

A cowl is placed on top of the chimney to prevent birds and other animals from nesting in the chimney. They often feature a rain guard to prevent rain or snow from going down the chimney. A metal wire mesh is often used as a spark arrestor to minimize burning debris from rising out of the chimney and making it onto the roof. Although the masonry inside the chimney can absorb a large amount of moisture which later evaporates, rainwater can collect at the base of the chimney. Sometimes weep holes are placed at the bottom of the chimney to drain out collected water.

3.4 H-Style Cowl

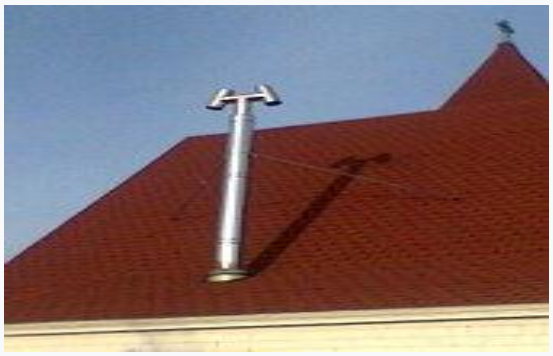

Fig 4.3: H-Style Cowl

An H-style cap (cowl) is a chimney top constructed from chimney pipes shaped like the letter H. (Its image is included in cowl (chimney).) It is an age-old method of regulating draft in situations where prevailing winds or turbulences cause downdraft and backpuffing. Although the H cap has a distinct advantage over most other downdraft caps, it fell out of favor because of its bulky design. It is found mostly in marine use but has been regaining popularity due to its energy-saving functionality.

The H-cap stabilizes the draft rather than increasing it. Other downdraft caps are based on the Venturi effect, solving downdraft problems by increasing the updraft constantly resulting in much higher fuel consumption.

3.5 Chimney Draught or Draft

The stack effect in chimneys: the gauges represent absolute air pressure and the airflow is indicated with light grey arrows. The gauge dials move clockwise with increasing pressure.

3.5.1 Flue Gas Stack

When coal, oil, natural gas, wood, or any other fuel is combusted in a stove, oven, fireplace, hot water boiler, or industrial furnace, the hot combustion product gases that are formed are called flue gases.

Those gases are generally exhausted to the ambient outside air through chimneys or industrial flue gas stacks (sometimes referred to as smokestacks).The combustion flue gases inside the chimneys or stacks are much hotter than the ambient outside air and therefore less dense than the ambient air.

That causes the bottom of the vertical column of hot flue gas to have a lower pressure than the pressure at the bottom of a corresponding column of outside air. That higher pressure outside the chimney is the driving force that moves the required combustion air into the combustion zone and also moves the flue gas up and out of the chimney. That movement or flow of combustion air and flue gas is called "natural draught/draft", "natural ventilation", "chimney effect", or "stack effect". The taller the stack, the more draught or draft is created.

4. Working Principle

4.1 Working Principle

It is, therefore, an object of the invention to provide a device for cleaning the exhaust gas by removing fine carbon particles effectively even during running of the automobile around the streets, thereby to obviate the above-described problems of the prior art.

To this end, according to the invention, there is provided a device for removing fine carbon particles from exhaust gas emitted by automobile engines or the like, characterized by comprising: first and second paths through which the exhaust gas from the engine is passed, a filter disposed in the first path and adapted to collect the fine carbon particles suspended in the exhaust gas, heating means disposed in the first path and adapted to burn the fine carbon particles collected by the filter.

A valve disposed at the juncture of both paths and adapted to selectively open and close the paths and detecting means for detecting the amount of carbon particles collected by and accumulated on the filter,

wherein the second path is opened by the valve and the heating means is activated when the amount of carbon particles collected by and accumulated on the filter has exceeded a predetermined amount.

The above and other objects, as well as advantageous features of the invention will become clear from the following description of the preferred embodiment of the invention taken in conjunction with the accompanying drawings.

4.2 Working

As the gas liberated from exhaust valve passes through exhaust manifold. First it reaches into charcoal casing form the perforated tube where the co is absorbed by charcoal powder charcoal and granule through a convergent section to tube which is immersed in oil.

Then gas reaches into the water chamber where the bubbles are formed and high mass bubbles are formed high mass bubbles are converted into low mass bubble as the gas passes through liquid forming bubble. Process as burnt oil is used to absorb the amount of carbon monoxide (CO) and hydrocarbon (HC) as well as sound is dumped. Then gas is passed through glass wool chamber the glass wool remove carbon particles.

5. Advantages, Disadvantages & Applications

5.1 Advantages:

1 It requires simple maintenance cares
2 Checking and cleaning are easy, because of the main parts are screwed.
3 Handling is easy.
4 Manual power not required
5 Repairing is easy.
6 Replacement of parts is easy

5.2 Disadvantages:

- Initial cost is high.

5.3 Applications:

1 Sugar Factory

2 Various Types Of Industry

6. Conclusion

Percentages of carbon monoxide (CO) carbon dioxide (CO_2) and unburned hydrocarbon are reduced from exhaust without change in the efficiency of the vehicle and noise also dumped due to the use of oil while the cost is low as comported to other types of silencer.

Also oil charcoal greatly reduced the harmful effecting human being accurse by vehicle pollution.

7. References

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