



AN IDEA OF TECHNOLOGY FOR CONTROLLING THE POLLUTANTS

Ramaswamy D. Malagatti* and Dr. Veda D.Malagatti

Dayananda Sagar Academy of Technology and Management Bangalore, Karnataka.

Article Received on 20/07/2020

Article Revised on 10/08/2020

Article Accepted on 30/08/2020

*Corresponding Author

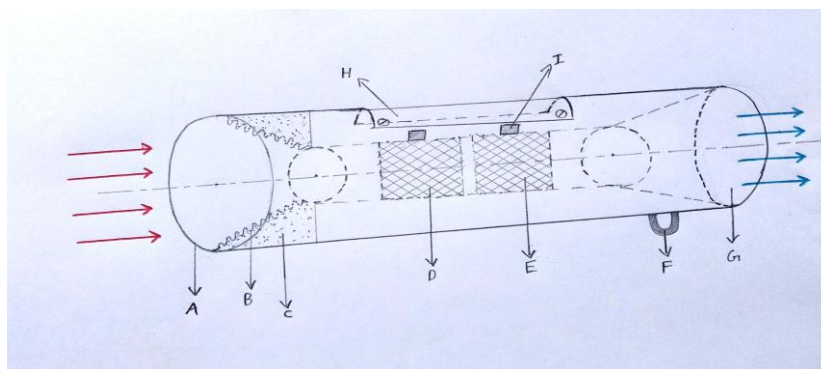
Ramaswamy D. Malagatti

Dayananda Sagar Academy of Technology and Management Bangalore, Karnataka.

POREDDER (Pollution Reducer)

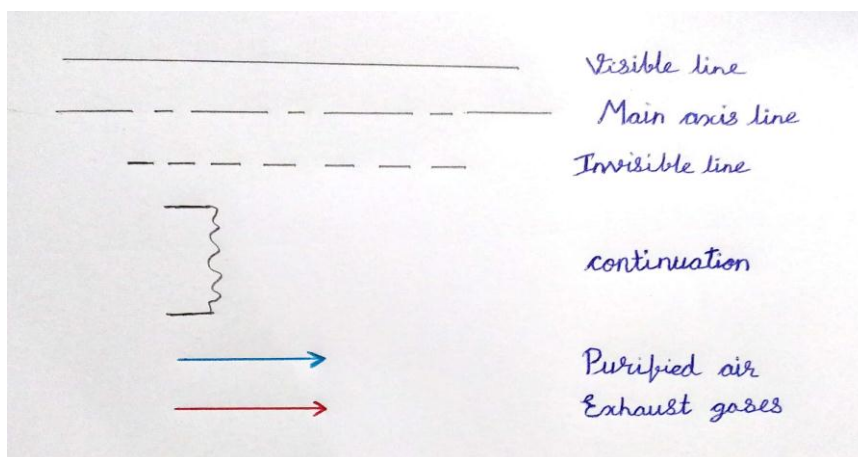
It is a device which removes all the pollutants (99.9% -100%) from the exhaust gases of any vehicle, at the silencer.

Description of Idea



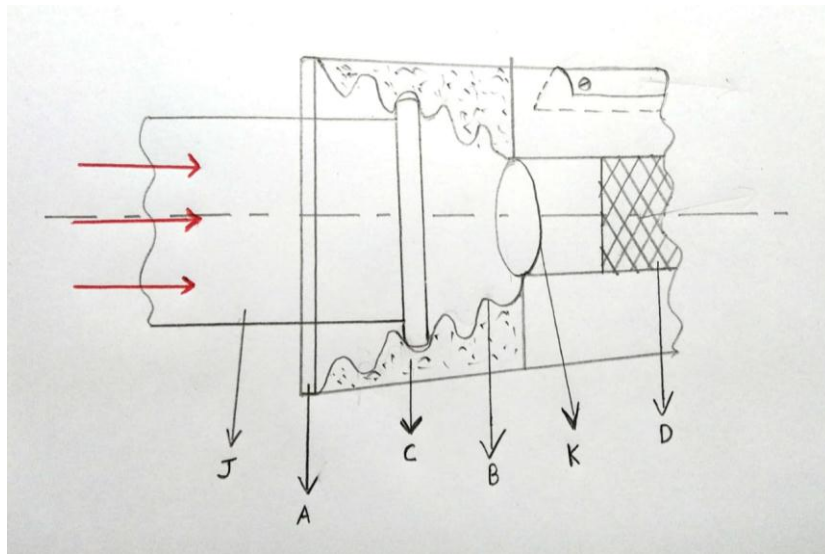
POREDDER

Representation Lines



Parts

A- Inlet of the device where silencer can fit in.



B- It is a Zig-Zag Narrowing type of pattern made from high heat resistant rubber material.

C- High heat resistant material rubber.

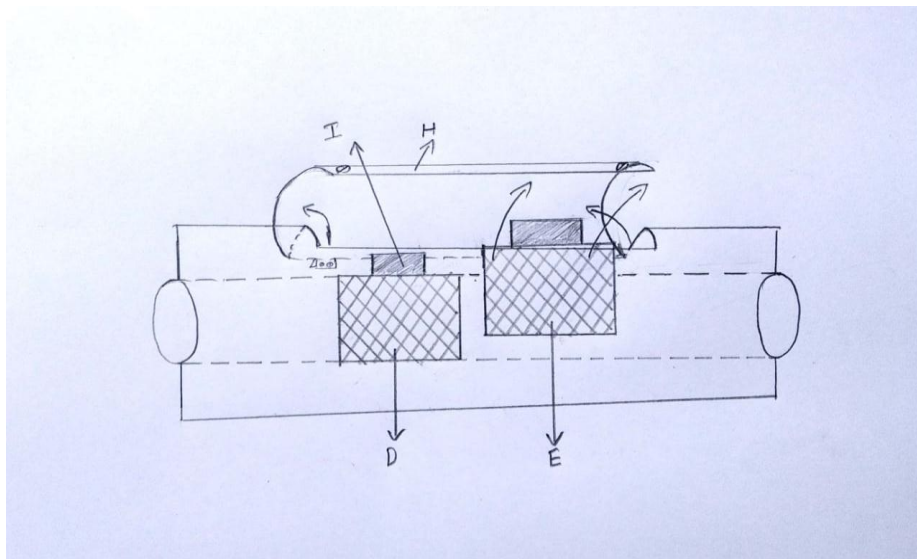
D- Modified Platinum and Rhodium in honey comb structure (block D)

E- Modified Platinum and Palladium in honey comb structure (block E)

F- Hook for emergency or external use.

G- Outlet of the device.

H- Opening cover for removal or replacement of the blocks D or E.



I- Holder to pull the block out of the device for repair or replacement.

J- Silencer (the exhaust gases exit the silencer and enter the device through the inlet).

K- Inner inlet of the device.

The idea is to purify and filter all the pollutants (99.9% -100%) from the exhaust of the vehicle by modifying the elements of the blocks ie Platinum, Palladium and Rhodium or find an element that can absorb all the pollutants by regulating the parameters like Temperature, metallic character's ,structure, electron affinity ,inductiveness etc of an element. This needs a lot of R and D (Research and Development).

Salient Features

- It filters or neutralizes the remaining 20% - 30% of the toxic pollutants in the exhaust gases given out from the catalytic converter.
- It is small in size.
- Effective and Efficient.
- Reusable, as the filtering blocks must be replaced periodically after specific time given.
- It can be modified according to the requirement of the silencers dimensions.
- The rubber in the inlet and its special design helps to fit the device onto any type of silencer.
- If manufactured in low cost it could be sold with low margins as the device is revolutionary and would change the air pollution levels in INDIA and the citizens would buy it.
- Once the device is used for a long time ,we could sell the blocks D&E separately so that the people should not buy the whole device again and go in loss, instead they can purchase the blocks separately and replace them in the device by them self's.
- Its service/repair or maintenance is very very low.
- We could use the used blocks for recycling if possible. As the recycling will bring down our inventory budget.
- Easy to use.

Applications

- It can be attached to any Vehicle's silencer (car, bike, Scotty etc).
- It can be attached to the generators exhaust pipe.
- It can be used in industries for purification of toxic gasses.
- It can be used in disposal of waste in burning methods.
- It can be used during the cremation.

Report**Facts**

- The total number of registered motor vehicles reached approx. 230 million in March 2016
- Registered Motor Vehicles (in millions)

Top 10 States

- Maharashtra: 27.9
- Tamil Nadu: 24.2
- Uttar Pradesh: 23.9
- Gujarat: 20.3
- Karnataka: 16.3
- Rajasthan: 13.6
- Madhya Pradesh: 11.1
- Kerala: 10.2
- Delhi: 9.7
- Punjab: 9.1
- Domestic Motor Vehicle Sales (Apr 2018 - Mar 2019)
- Passenger Vehicles: 3.38 million units
- Commercial Vehicles: 1.01 m
- Two-wheelers: 21.18 m
- Three-wheelers: 0.7 m

TOTAL: 26.27 million units

Pollutants emitted by vehicles

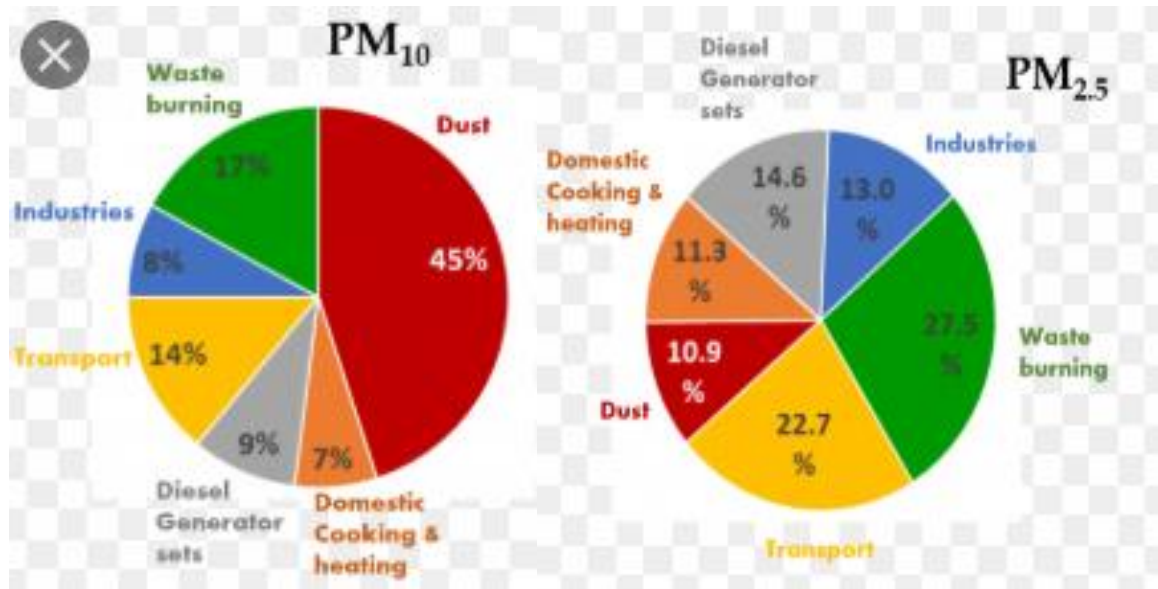
- The catalytic converter oxidizes gases such as CO, NO, and HC to CO₂, NO₂, and CO₂ and water. But 20% -30% of the toxic pollutants are emitted without neutralizing or in less concentration.
- Particulate matter (PM). One type of particulate matter is the soot seen in vehicle exhaust. Fine particles — less than one-tenth the diameter of a human hair — pose a serious threat to human health, as they can penetrate deep into the lungs. PM can be a primary pollutant or a secondary pollutant from hydrocarbons, nitrogen oxides, and sulfur dioxides. Diesel exhaust is a major contributor to PM pollution.

- Volatile Organic Compounds (VOCs). These pollutants react with nitrogen oxides in the presence of sunlight to form ground level ozone, a main ingredient in smog. Though beneficial in the upper atmosphere, at the ground level this gas irritates the respiratory system, causing coughing, choking, and reduced lung capacity. VOCs emitted from cars, trucks and buses — which include the toxic air pollutants benzene, acetaldehyde, and 1,3-butadiene — are linked to different types of cancer.
- Nitrogen oxides (NO_x). These pollutants form ground level ozone and particulate matter (secondary). Also harmful as a primary pollutant, NO_x can cause lung irritation and weaken the body's defenses against respiratory infections such as pneumonia and influenza
- Carbon monoxide (CO). This odorless, colorless, and poisonous gas is formed by the combustion of fossil fuels such as gasoline and is emitted primarily from cars and trucks. When inhaled, CO blocks oxygen from the brain, heart, and other vital organs.
- Sulfur dioxide (SO₂). Power plants and motor vehicles create this pollutant by burning sulfur-containing fuels, especially diesel and coal. Sulfur dioxide can react in the atmosphere to form fine particles and, as other air pollutants, poses the largest health risk to young children and asthmatics.
- Greenhouse gases. Motor vehicles also emit pollutants, predominantly carbon dioxide, that contribute to global climate change. Trains and ships accounts for around thirty percent of all heat-trapping gas emissions.

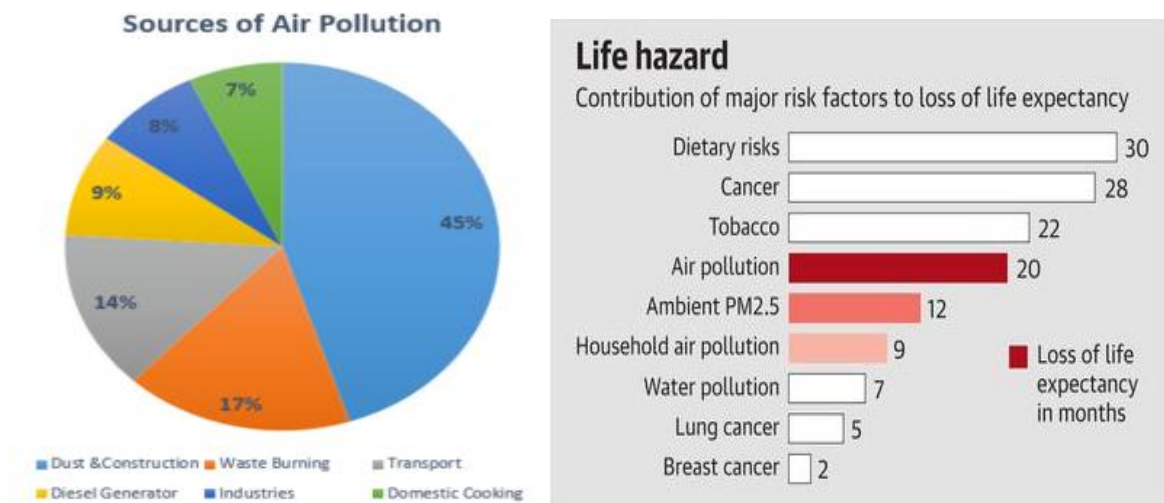
Air pollution diseases

- 40% – ischemic heart disease.
- 40% – stroke.
- 11% – chronic obstructive pulmonary disease.
- 6% - lung cancer.
- 3% – acute lower respiratory infections in children.
- Cardiovascular damage.
- Fatigue, headaches and anxiety.
- Irritation of the eyes, nose and throat.
- Damage to reproductive organs.
- Harm to the liver, spleen and blood.
- Nervous system damage.

Some particles less than 10 micrometers in diameter can get deep into your lungs and some may even get into your bloodstream. Of these, particles less than 2.5 micrometers in diameter pose the greatest risk to health.



Exposure to outdoor and indoor air pollution contributed to over **1.2 million** deaths in India in 2017, air pollution is the third biggest cause of death.



Poredder can also be called as modification or advancement or new version of Catalytic converter.

Working

- Once the Poredder is fitted to the silencer , as the vehicle is used and the exhaust gasses are produced.

- The exhaust gases produced will enter the poredder through the inlet and the Blocks D&E will absorb all the pollutants in the exhaust gas.
- The purified and filtered gas or air will exit to the atmosphere by the outlet of the device.

CONCLUSION

- Hypothetically if another device was invented or made for the same purpose, it would take 5-10 years or more as the device has to be made inbuilt to all the new automobiles and this would be a great challenge to them. And what about the existing automobiles?
- So the main advantage of this device is that it can be made and used to the existing automobiles and the new ones too but the automobile industry need not worry. As this device can be instantly fixed and removed when required.
- And as this device is small and light it can be used by a 10 year old kid to fit or remove it from the silencer with precaution. Therefore it's handy and the blocks can be replaced when its time period of usage is over.
- The blocks can be replace as the blocks would be available separately at low cost and saves the buyer from loss of purchasing a new device again.
- The blocks thrown away after used once by the users could be recycled (based on the material composition of the blocks) which will further reduce our manufacturing or inventory cost and saves us from the worry of being disposed haphazardly in the environment.

REFERENCES

1. <https://www.bing.com/search?q=pollutants+emitted+by+vehicles&cvid=877c738362a64754a8e7436a2efb1124&FORM=ANNTA1&PC=HCTS>.
2. [https://chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbook_Maps/Supplemental_Modules_\(Physical_and_Theoretical_Chemistry\)/Kinetics/Case_Studies%20of%20Kinetics/Catalytic_Converters](https://chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbook_Maps/Supplemental_Modules_(Physical_and_Theoretical_Chemistry)/Kinetics/Case_Studies%20of%20Kinetics/Catalytic_Converters).
3. <https://www.statista.com/statistics/664729/total-number-of-vehicles>.
4. <https://www.bing.com/images/search?q=source%20of%20air%20pollution>
5. <https://www.bing.com/images/search?view=detailV2>.
6. <https://www.honeywellsmarthomes.com/blog/diseases-caused-by-air-pollution/>