ISSN No:-2456-2165

Device Turns Air Pollution into Ink

Swastika Thakur, Shruti Sindhi
Computer Department, Vivekanand Education Society's Institute of Technology
Mumbai, India

Abstract:- **This paper is written with the vision of utilizing the resources which were ignored till now. Air pollution can be harvested to produce a substance as useful as ink. Kaalink is a device that smartly detoxifies heavy metals and particles Carcinogens from the soot or carbon. The pollutants which can harm our lungs can appeal our eyes in the form of art.**

Keywords:- *Kaalink, Air Ink, Air Pollution, Soot.*

I. INTRODUCTION

Unburned carbon particles from industries, chimneys are more than just smelly and unsightly. They can adversely affect health leading to shortness of breath, asthma, stroke, cancer, heart attack, bronchitis and premature death. With time, technology has proved that stuffs which can't be touched can also be recycled and repurposed in the form of ink. It is an expansion of technology to make an eco-friendly environment. This evolved idea fuses science, technology and art. There is a rich carbonaceous content in the polluted air due to burning of fossil fuels. The proposed device is designed as a smart and clever combination of electronic sensors, collection system and mechanical actuators.

II. CURRENT SCENARIO

Last few decades has witnessed enormous production of ink by burning large amount of fossil fuels. This article aims at conserving our reserved resources and thereby protecting the nature. Moreover large amount of harmful gases are released into the atmosphere. Soot is even thinner than the diameter of human hair strand and can easily enter our blood streams and lungs. Vehicles, chimneys and boats serves as a major source of soot formation. Apart from affecting the environment it can also deform the human organs. The research has claimed that the soot can be cleaned up and utilised for various purposes. One of the major application where this unburned carbon can be utilised is in manufacturing of air ink.

III. DEVICE DESCRIPTION

A cylindrical device named Kaalink is a post tailpipe retrofit. It is a reusable device that filters about 85-95% of soot emissions from a vehicle. It is a mechatronic system which comprises of various filters, sensors and capture unit. Various capture techniques include electrostatic filtration, depth filtration, wall flow filtration and many more. The desired granularity can be attained by channelling the mentioned filtration techniques. Unburned carbon particles as a result of incomplete combustion of fuels are collected within the wall of the device whereas the air is released outside. The air flow rate and the captured process is adjusted accordingly to avoid back pressure that would have pushed back the exhaust into the engine.

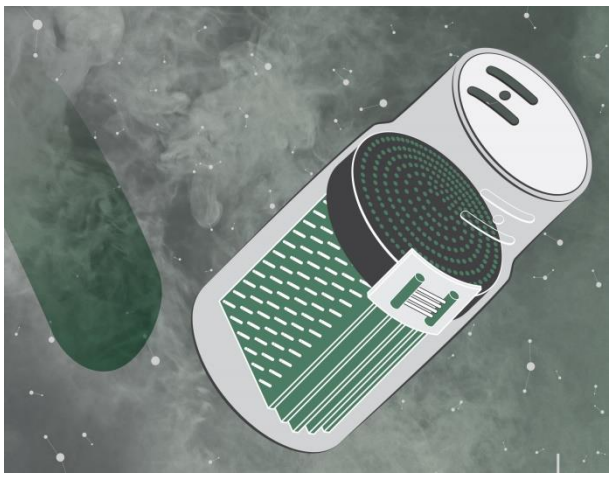

Fig 1:- Kaalink Arcitecture

IV. PURIFICATION AND INK PRODUCTION

The resultant obtained in the Kaalink unit is again purified using chemical processes starting with gravity based separation for high mass particles, to comminution and catalysed activation. In other words, pigment is made by removing glass and heavy metals leaving just dust sized particles. The consistent particle of soot can be obtained by the grinding process. To acquire the right consistency at time the particles are mixed with vegetable oil which varies according to the product: pen-ink, markers, oil-based paint, screen printing ink and outdoor paint. The generated waste is managed by some of the leading waste management company and recycled as per the needs.

V. DEVICE PERFORMANCE

The whole process of manufacturing the Kaalink and extracting the soot from vehicles makes it environmental friendly and carbon-neutral. It captures more carbon emissions than usually required to produce ink. Air ink is better than regular black ink since it doesn't burn extra fossil fuels. The developed ink is better, thicker and darker than the traditional ink. Forty five minutes pollution can be negated using thirty ml of air ink. Carbon dioxide will still reside in the air but the proposed device will try to reduce the level of carbon soot which is the reason for pollution called PM 2.5. Kaalink is used to capture soot which is then processed to make air ink. The unit captures 95% of particulate matter without inducing back pressure.

Sr No.	Types		
	Diesel car pollution time	**Diameter of marker**	**Applications**
1	40 minutes	0.7 mm round tip	Fine point marker for everyday creativity
2	50 minutes	2 mm round tip	Shading and small details
3	130 minutes	15 mm chisel tip	Thick lines and small strokes
4	130 minutes	50 mm wide tip	For murals and large pieces

Table 1:- Marker Types

VI. RESULT

The particles regain it's carcinogenic properties by it's floating ability in air and thus being able to enter into the respiratory system. The particles cannot float in the air if they are captured in form of ink.

VII. CONCLUSION

If this idea gets the desired acknowledgement and recognisation, it can be worked towards releasing oil based paints, fabric paints and other outdoor paints and many more. Though the substitute for fuels such as petrol and diesel can be found it will definitely take some years. The ink produced is not edible and is yet to be declared whether it is safe for children below the age of six years.

REFERENCES

[1]. http://www.graviky.com/kaalink.html
[2]. http://www.graviky.com/air-ink1.html
[3]. https://www.fastcodesign.com/3067701/this-mit-spin-off-turns-car-exhaust-into-super-black-paint
[4]. http://insights.globalspec.com/article/4192/art-from-auto-tailpipe-emissions
[5]. http://www.businessinsider.in/an-mit-startup-made-a-simple-device-that-turns-filthy-car-exhaust-into-beautiful-ink/articleshow/57155874.cms
[6]. http://www.huffingtonpost.in/2016/08/21/this-start-up-claims-to-be-recycling-polluted-air-to-make-ink-an/
[7]. http://www.psfk.com/2017/02/startup-turns-car-exhaust-into-artful-pen-inks.html
[8]. http://www.citylab.com/tech/2016/03/the-innovative-ways-people-are-recycling-air-pollution/471999/
[9]. http://www.livemint.com/Leisure/QtAfbCh9RYN5aZR9V6CdyI/Graviky-labs-When-soot-turns-to-ink.html