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Reducing the Waste Oil Decomposition and Producing a useful Energy Conversion Process

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ABSTRACT

Our project is about waste oil burning system, now a days many of the fuels are available to run a vehicle or to produce power. Nowadays we are using the many source of power and the same thing it will not properly disposed and it affect the environment , we have to stop affecting the environment. So we decided to used as Waste Oil is defined as any petroleum-based oil , In world wide approximately 1.3 billion gallons of waste oil are generated from the crankcases of millions of automobiles and trucks whenever the oil is changed. Approximately 200 million gallons of waste oil are not disposed of properly. Waste oil can be disposed of in a variety of ways, including by sending it off-site (some facilities, like your local garages and waste disposal facilities, are allowed to handle the waste oil), burning it as fuel and selling the used oil claims are made that the used oil is to be burned for energy recovery, and then it is shipped to a used oil burner who burns the used oil in an approved industrial furnace or boiler. A minimum flash point of 100°F.. According to the EPA (Environmental Protection Agency) , a waste oil furnace is a type of furnace that is used for heating and is powered by old oil that is free of hazardous impurities. Boilers powered by waste oil can be utilised for a variety of commercial tasks in addition to heating. In our project we are deside to fabricate waste oil stove by reducing the use of the LPG or other electrical stove. In the burners were developed as a way to effectively burn the waste oil and to provide alternative heating systems.In this project work all the challenging parts are fabricated as per innovative design and then rigidly assembled to perform the indented function. We have to recycle the waste oil and reduce the pollution.

KEYWORDS: Waste Oil, Fire Point, Alternative uses, Burners, Stove

1. INTRODUCTION

Waste Oil Burning System, which is commonly known as 'Used Oil', is an automobile industry a broad spectrum of businesses and organizations engaged in the creation, production, marketing, and sale of automobiles [1]. It is one of the biggest industries in the world.We are majority concert on waste oil from the automobiles. Any oil that has been contaminated with hazardous waste may also be considered to be such, and if so, it must be managed in accordance with the criteria for managing hazardous waste. Some types of waste oil from automobiles are synthetic oil, grades 1, 2, 3, and 4 of fuel oil, hydraulic oil, transmission oil, braking fluids, motor oil, crankcase oil, gearbox oil. We have to used vehicle crankcase oil because they are easily available and it has lower ignition temperature around 230`C.A

waste oil burner is a type of warm air heating system. The burner draws in cold air and forces it over a heating element, which then raises its temperature. Once heated, the air is blown through the ducts and vents to heat your storein the waste oil burning system is a useful way to reuse the waste oil and protect the environment. And the same way it as to affect the oxygen content in the air because of burning the fuel, both have their respective merits and demerits.

CLASSIFICATION OF STOVE;

1. Electric stove
2. Gas stove
3. Pellet stove
4. Induction stove
5. Potbelly stove
6. Downdraft extractor stovetop
7. Cook stove
8. kerosene stove types - the wick type and the pressure type.
9. Furnace
10. Heat exchanger

2. LITERATURE SURVEY

Through the comprehensive review of literature, the basic operations of waste oil fired stone and importance of its individual terms are studied. Through the literature we have known that the cost of oil fired stove, furnaces is less than induction furnace. So there exists the opportunities for improving the efficiency of cooking processes by using the waste oil firing process.

The waste oil fired stove was should be designed, optimize and install carefully in order to reduce the waste oil and the useful ways of disposal method

A. Problems Identification

From the literature survey it is seen that use of oil fired furnaces exits from long back, but less work is carried out using waste engine oil for firing the waste oil for cooking. Hence in the present research work an attempt is made to design, fabricate and test the furnace fired with waste engine oil is need a ignition temperature to attain the certain heat to get ignition to we provide a proper ventilation.

B. Objectives

The aims and objectives of the present study are as follows:

- To design economical waste oil fired stove with better performance than the other type of stove.
- To be protect the environment by reduce the waste oil.
- To create a design of waste oil stove.

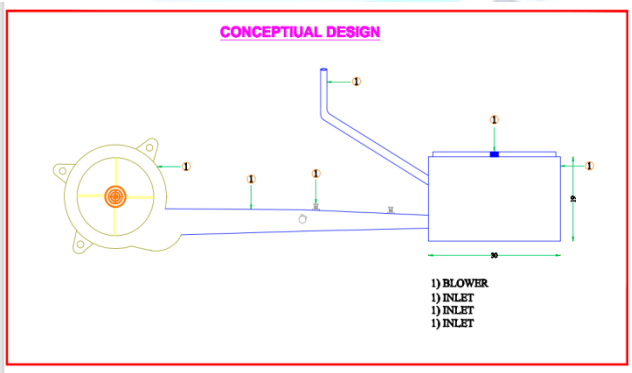
C. Methodology

Following are the Methodologies adopted to attain the above stated objectives

1. Case Study
2. Problem identification
3. Performing operations like,
   - Drilling,
   - Grinding,
   - Hammering,
   - Welding –arc welding .

If you are using *Word,* use either the Microsoft Equation Editor or the *MathType* add-on (http://www.mathtype.com) for equations in your paper (Insert | Object | Create New | Microsoft Equation *or* MathType Equation). "Float over text" should *not* be selected.

3. DESIGN AND FABRICATION OF WASTE OIL STOVE



CONSTRUCTION;

- In the waste oil stove is to consists of a outer layer is mild steel, then the inner layer is concrete mixture .
- All sides of the stove is made of the mild steel because is a heat resistance and high toughness and at low cost.

- In the sides of the stove we made a oil flow pipe and air flow pipe.
- The center and inner region we made a burner .

WORKING PRINCIPLE;

1. Attached blower to the convergent nozzle.
2. And the nozzle is attached to the air flow of the pipe of the waste oil stove with the help of insulating tape. Cotton and kerosene is put in to the stove.
3. And we make burning on it with the help of match box.
4. We get the heat of it and the flame occur this burning procedure will takes 5 minutes no blower is needed. Then the temperature is increase then we pour the waste oil on the stove because the ignition temperature of the waste oil is around 300 degree Celsius of to occur to burn, that's why we use the kerosene.

5. Waste oil stove is burning. Our project disadvantage is we bun the oil the some of gas is formed on it, We have to control the gas then we add some additive to the oil we can control the flow of the gas then they don't affect the environment.

SELECTION OF MATERIALS ;

A. Mild Steel :

Our project is made full of mild steel only. Because of is cost is less and high heat resistance. It is most widely used in automobile and machine manufacturing components.

Advantages;

1. Ideal mechanical properties
2. Favorable chemical properties
3. Weldable
4. Cost-effective

Common Applications of Mild Steel;

1. Structural Steel
2. Sign boards
3. Automobiles (two wheeler, Four wheelers)
4. Furniture
5. Decorations
6. Wires

For why do we prefer mild steel as the following above properties. In the mild steel we are making a stove for shapes like as box, square and 's' like shapes. And to we performing the operations to get a required shapes, and welded on it.

B. Waste Oil:

Waste oil is kind of oil is it obtained from the automobile (two wheelers, four wheelers), industries and etc. In this oil contains many of the impurities substances like chromium, lead and etc. In The crankcase and lubrication wastes produced because notroutine maintenance of motor and some machinery parts andvehicles are the source of waste oil produced.

Types of oil based on grade,Used for engine

Motor oil viscosity grades

1. 0W-20.
2. 0W-40.
3. 5W-30.

4. 5W-40.
5. 10W-40.
6. 15W-40.
7. 20W-50.

5W-30 The most widely used and widely accessible motor oil . The low engine oil viscosity grades, which are often suitable for winter operation, terminate with a "W."

In the Indian market, it is regarded as the most advanced. Its effective performance with the least amount of sludge in both hot and cold climates. It makes it perfect for modern gasoline and diesel-powered automobiles.

5W40: This oil is regarded as suitable for diesel vehicles. It can operate just as well as 0W40, but not in really cold weather.

Ideal for current petrol engines are 5W30 or 10W30. Because of its low viscosity and low cost, it works well with current petrol engines and provides good fuel efficiency.

Available in mineral and semi-synthetic varieties, 10W40 is appropriate for the climate in India. Cost-effective choice that performs well.

It is typically advised for older engines and is significantly thicker than its competitors (15W40 or 20W50).

C. Making of Concrete :

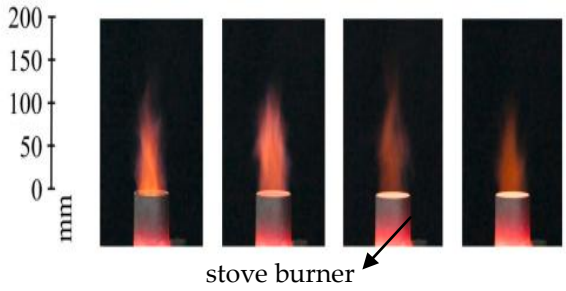
Materials used to make concrete:

Sl no.	Materials used	Quantity	Cost
1.	cement	2kg	30
2.	sand	4kg	40
3.	Gravel stone	5kg	50
4.	water	As req.	30

D. Observation :

We can get the flame of the by adjusting the speed of the blower and pouring the oil we can obtained.

In the below we can see the flame height is achieved.



For Blower Calculation:

Area of suction $-\pi \times r^2 = 3.14 \times 0.2 \times 0.2 = 0.1256 m^2$

NOZZLE – INCREASES THE PRESSURE BY REDUCING CROSS-SECTION AREA INLET TO OUTLET

For Stove Calculation:

Capacity – $\pi r^2 l = 3.14 \times 0.5 \times 0.5 \times 0.12 = 0.094$

4. RESULT, DISCUSSION

Results

By taking trail of the work the outcome of the machine takes place and gathering all information about all other methods, we have get some result that the waste oil if takes some ignition to start the before we pouring the waste oil. On takes some time to 3-5 minutes to start we put kerosene to burn to attain a certain temperature to takes because the ignition temperature of waste oil is around 300'c. And the test we got some smoke because burning of waste oil. Then we got to make two stoves the second one is success full our first try is failure because we not provide a space for the burner and the height of the stove is very high so flame is not get the top layer of stove, So then we made the second one is small in size and got space for the burner. The objective of the work which is to be design an waste oil stove is achieved to an extent.

Discussion

Although the main motto of our project is to get the changes in used circumstances of our environment to be safe and secure. By is the one of the effective way to use the waste oil by secure the environment is achieved. By make it use as mass production and many types have to outcome of the stove like producing electricity by burning the oil and so on it.

5. CONCLUSION

In this section we are going to discuss about the various steps which we use to run our design and fabricated waste oil stove. Before every method it is important that we check every parameter so that during implementation we cannot get any problem. The system was designed with some features which reduces the use of LPG and electric stove then solar stove also because rainy days not use the solar. Very simple tool work is needed, and material used is very reasonable that makes this project cheap and easily usable. So, it is not complicated to construct this stove

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

REFERENCES

[1] Automotive industry at the Encyclopaedia of britannica (https://en.wikipedia.org/wiki/Automotive_industry#cite_note-:0-1)

[2] Nawrocky M, Schuurman DC, Fortuna J (2010). Visual Sorting of Recyclable goods using a support vector machine. Electrical and computer engineering, Canada: IEEE. 23(10): 1-4.

[3] House BW, Capson DW, Schuurman DC (2011). Towards real-time sorting of recyclable goods using support vector machines. Sustainable systems and technology, Chicago: IEEE International symposium, pp 1-6.

[4] PRNewswire (2015). Waste Management in the Automotive Industry 2015-2019. http://www.prnewswire.com /news-releases/waste-management-in-the-automotive-industry-2015-2019-300173788.html.

[5] C Ghiaus, R Belarbi, F Allard, Optimal settings of residential oil burners, Energy and buildings, 34 (2002) 83-90

[6] E. Lincheta, J. Barroso, J. Suarez, F. Barreras and A. Lozano, Performance of internal mixing air-assisted nozzles for heavy fuel oil burners, Zaragoza, 2002, 9 – 11.

[7] M. S. Liu ,C. K. Choi and C. W. Leung, "Start-up Analysis of Oil- Fired Furnace – The Smoothing Monte Carlo Model Approach", Heat and Mass Transfer 37 (2001) Springer- Verlag 2001 , Pages 449–457.

[8] Chukwudi. B.C. and M.B. Ogunedo. 2017. Design and Development of a Gas Fired Reverberatory Furnace: In View of Huge Gas Reserves in Nigeria. Pacific Journal of Science and Technology.

[9] Chun Lou a, Wen-Hao Li a, Huai-Chun Zhou a, Carlos T. Salinas, "Experimental Investigation on Simultaneous Measurement of Temperature Distributions and Radiative Properties in an Oil Fired Tunnel Furnace by Radiation Analysis", International Journal of Heat and Mass Transfer 54 (2011), Pages 1–8