Automatic Waste Pickup Cleaner

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Abstract - *A Dynamo of specific rating will be connected with its shaft to the shaft of rear tire of bicycle. The rotational energy will be converted into electrical energy with the help of dynamo and this energy will be transmitted to the 12-volt DC universal motor which is the prime mover of vacuum cleaner. This vacuum cleaner will have an aluminum mesh on the tip of its other end which will prohibit the vacuum cleaner to suck the heavy stones and pebbles, so it will not be damaging the system.*

Therefore, the rotational energy by pedaling will be used to suck the waste by vacuum cleaner and the waste will be channeled to the waste container mounted on the pillion.

Clean energy with greater efficiency is implemented in this project. The project does not use any battery or non-renewable source of energy.

Future advancements – future advancements in this project would be disposal of waste without touching to the specific dustbin of decomposable or non-decomposable category.

***Key Words*: Vacuum, Motor, Dynamo, Energy, Waste**

1.INTRODUCTION

In this project a Dynamo of 12 volt, wires, 9 volt universal motor, self-made diy vacuum cleaner are used.

Rotational energy of wheel of bicycle will get converted into electrical energy with the help of dynamo. This electrical energy will be directed to the self-made vacuum cleaner. The vacuum cleaner has 9-volt universal motor which turns on when it gets supply from the dynamo.

As soon as the vacuum cleaner starts operating, it sucks up the waste from the ground and directs the waste into the dust bag mounted on the pillion of bicycle on motorcycle.

In this way using free energy of bicycle waste picking can be achieved.

1.1 OBJECTIVE OF THE PROJECT

Swachh Bharat Abhiyan was one of the most celebrated and on ground activity by the Government of India. The main motto of this mission was to clean India. Many campaigns were laid, meetings were held and technologies were implemented. But where the system lagged was the ground level solution with the help of technology. In this light, automatic waste pickup vehicle will prove to be an efficient solution of the loophole.

This system can be implemented on any two-wheeler of the country and where the two-wheeler will roam, it will pick up waste littered all around and store in the bag container. The collected waste may be further disposed to the particular dustbin as per its disposability.

The solution which we have proposed is cost efficient, easy to implement, wonderful use of technology and a perfect example of automation**.**

1.2 ADVANTAGES

2   it is a very affordable means of roads cleaning
3   it is a means of continuous cleaning for all the places where the bike goes.
4   it can effectively suck in the small plastic waste which might be left out by the big cleaning trucks.
5   the dust created by big cleaning trucks is omitted by such means.
6   it is a one-time investment by coasting perspective.

1.3 DISADVANTAGES

1   there might be chances of small gravels getting stuck in the vacuums, mesh
2   there might be chance that a partially suctioned piece of waste gets stuck in the mesh.

2.   LITERATURE SURVEY

India has a population on 136.64 crores which produces a waste of 277 million tones every year. This is about 13% of the waste produced by the world.

Factors such as growing population and economy, which means increased volumes of waste generated and a boost in urbanization and industrialization mean tones of waste and garbage produced by various sectors of different industry.

Also, the inefficient waste disposable system doesn't cater to the problem in the required manner. This further elevates the waste disposal problem to a certain extent that the waste management system fails.

3. RESEARCH METHODOLOGY

According to us the research methodology, is going to be a place where we will be showcasing what we are going to be doing in our project. it is a defined procedure of how and what all considerations have we taken into practice.

1. – we have taken into consideration what is the current market scenario for the electrical vehicle, and what are the specifications that have been declared by the government. for them to have an efficient electrical vehicle
2. we have made all the calculations over here based on the data that we collected via stimulation on the XYZ software. In here we have also taken into consideration what are the equipment's that we will be needed to make the vacuum cleaner for the electrical bike and which are as follows.

4. EQUIPMENTS REQUIRED:

- Universal motor
- wires
- vacuum bottle
- dynamo
- dust bag
- aluminum mesh
- plastic fan
- Pipe

Universal Motor Selection: While we had to decide the amount of weight that the garbage should contain so that it can be stopped by the equipment that we have been creating. We got to know that for the amount of pressure which is 5atm the garbage would be creating; we would have needed 1000RPM of rotation.

$$Pressure \propto RPM$$

And to have produced the 1000 rpm we need 12 V motor to produce that we have selected the 12 V of DC universal motor.

Wire Selection: With keeping in mind that we will be Requiring a wire which has to not only be used inside the vacuum cleaner but to be between the dynamo and the universal motor whose distance would not be exceedingly more than 1m to 2 m and hence this is the length of the wire that we have taken considering the length of the vacuum bottle.

Description	Specifications
length	1-2 meter
Cross section	1mm
material	aluminum

Vacuum bottle Selection:

- The vacuum bottle inside which vacuum cleaner will be created has been designed with respect to a lot of practical examples.
- such as the silencer of a bullet bike, and which we have thoroughly designed and examined and observed for the best practical design for our vacuum bottles specifications.
- We have kept in mind how the sturdiness the anti-corrosive, anti-explosive and weatherproof, features should the vacuum bottle have so that there are no diverse effect of the environment, on the bottle.
- it is Long-lasting as well we have also studied how the other features such as ergonomics, performance and durability factors of the bike should not be affected by the installation of the vacuum cleaner on the bikes.

Details	Specifications
Product dimensions	*35 x 10 x 8 cm*
Color	*black*
Weight carrying capacity	*2 kilos*
material	*Mild steel*
finish	*premium*

Inlet	44mm

5. WORKING PRINCIPLE

In here we aim to use the The law of conservation of energy to run the project. When the bike is going to be peddled and the rotational energy will be produced. We aim to convert that rotational energy that has been created into electrical energy which will be done by the help of the dynamo. that electrical energy will in turn run the vacuum cleaner and hence the vacuum will be produced.

Law of conservation of energy: For the law of conservation of energy we have seen that created nor be destroyed but it can be converted from one form to another. so over here what we will be doing is converting the rotational energy into the electrical energy and no exterior power supply would be required for the same. Those on the conservation of energy would be done and the vacuum cleaner will be operated. The conservation of energy that is been used over here is quoted below and is as follows:

$Ki + Ui = Kf + Uf$

Ki= initial kinetic energy

Ui= initial potential energy

Kf=final kinetic energy

Uf=final potential energy

Working- Initially we start by creating the rotational energy which is by the pedaling.

Now this energy which is created is said as an input to the dynamo which is of 9 V.

Now it is the job of the dynamo to convert the rotational energy into the electrical energy this is how again the law of conservation of energy is used by converting one form of energy into another.

This conversion of rotational energy to electrical energy will be directed via wires to the 12 V universal DC motor.
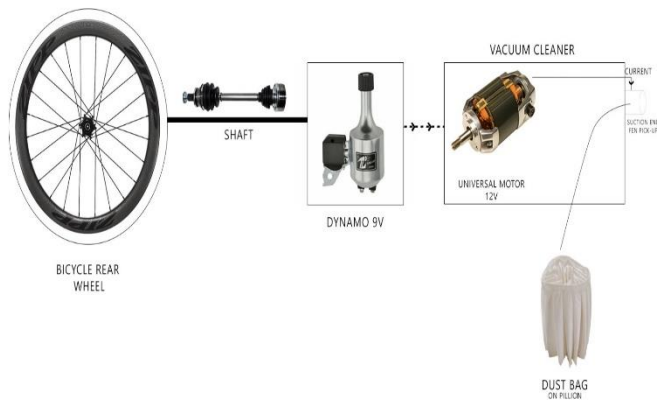
We have taken – 12 V DC universe and motor as a component of vacuum cleaner which will be mounted vertically downwards on the mudguard of the cycle or the bike on which the vacuum cleaner has to be attached.

Hence when the cycle moves and the peddling is done due to the Bro created rotational energy and the electrical convert electrical energy produced due to the conversion of dynamo the vacuum cleaner will operate and it will suck up light weight which is less than 5 g and is scattered on the road.

The suck the waste is going to be directed to the dust bag on the filing of the vehicle with the help of a pipe which is attached to the end of a vacuum cleaner.

Over here we intend to pick up the waste which is less than 5 g which includes the plastic wrappers of the chips biscuits and etc and the another category that we intend to target is of the small plastic bags and chocolate wrappers which have been scattered on the road. And this is the basis on which we have decided the pressure that the vacuum cleaner should create so us to suck to waste.

Maximum target wait for us is going to be 5 g which will be applicable for both the light and the heavy waste (chips wrapper).

6. CALCULATIONS

Max weight to pickup target= 5gm

Pressure=force/area=weight/area

Pressure(atm unit)=5gm/1 m2 (max)

To create 1 atm pressure, motor rpm=200

In our case, 5 atm=1000 rpm via universal motor

Hence, vacuum cleaner with 12v, 1000 rpm motor will vacuum up our targeted waste

We do not intend to change the pressure with an outlet while because we think that if the pressure is created according to the highest waste machine should be sucking then it will be applicable for both the light and heavy waste and those we eat to keep the pressure constant and not change it.

Calculations done and then design and simulation of the motor done using Proteus Software.

7. CONCLUSIONS

From the above experiments and results we concluded that the device is extremely reliable and efficient. The device was able to filter out garbage from other materials because of a small gauze fitted inside it. Other components were stuck up the gauze and the waste materials were sucked up by the machine directly to waste bag.

The future prospects of the project are fairly high as it is a very capable machine which can be used to clear out garbage. Also as we are venturing into the future the prospects of the device are bright as it can be paired with a micro controlled chip which will result in a better functioning of the device.

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