Portable Vehicle Cleaning Machine

Sathish Kumar K S[1], Petchimuthu.M[2], Ranjith.k[3],Sachin Kumar. S[4], Sheik Mujebar Rahuman.S[5]
[1]Associate Professor, Dept of Mechanical Engineering
[2, 3, 4, 5]Dept of Mechanical Engineering
[1, 2, 3, 4, 5] Rathinam Technical Campus, Coimbatore

Abstract- *Vehicle cleaning is one of the most important in all automobile sector. It gives a challenging task to clean the bottom portion of the vehicle. At present to clean the bottom side of the vehicle either it has been lifted or part cleaning is carried out. To avoid such difficulties, different mechanism have been framed out and optimized system have been finalized.Our project is "Portable vehicle cleaning Machine "The main aim is to clean all parts of vehicle (2 wheelers and 4 wheelers) including outside and inside automatically and especially in engine area (or) differential side areas. The machine have been designed and analysed for its optimization using finite element analysis; the model will be fabricated by using some electro-mechanical arrangements. It includes nozzle, pump, water tank, scrubber and bearing. It is very simple and efficient way to fabricate this model. It is one of the innovative concepts in the line of automotive field.*

Keywords- Hydraulic, pneumatic, electro – mechanical.

I. INTRODUCTION

A **vehicle wash** (also written as "**carwash**") or **auto wash** is a facility used to clean the exterior and, in some cases, the interior of motor vehicles. Car washes can be self-serve, fully automated, or full-service with attendants who wash the vehicle. With the modern convenience of touch less automatic car washes, it may be difficult to remember that the industry was not always so high-tech. Though, other commercial car washes came before it, the first semi-automatic car wash in the United States made its debut in 1946, and from there, the industry has grown in both size and sophistication.

II. OBJECTIVE

Our project is "**Portable vehicle cleaning Machine** "The main aim is to clean all parts of vehicle (2 wheelers and 4 wheelers) including outside and inside automatically and especially in engine area (or) differential side areas. The machine have been designed and analysed for its optimization using finite element analysis; the model will be fabricated by using some electro-mechanical arrangements. It includes nozzle, pump, water tank, scrubber and bearing

III. HOW DO THEY WORK?

The main components involved in **portable vehicle machine** consist of frame (fixed frame and movable frame), scrubber, bearing, hinge joints, linkages, and tyre, handle, pump and water tank. All components are mounted on the frame called base frame. Movable frame involves scrubber, nozzle area. Fixed frame is connected to the movable frame by using keel joints and it's locked by the certain height (depend upon the bottom clearance area where we are going to rubbed) by using hinge joints and linkages. DC motor is used to rotate the scrubber. Pump is used to pump the water from the tank and send to nozzle surrounding area. By using set up the bottom portion of the vehicle will be cleared thoroughly. For cleaning the inside part of the vehicle first dry air will be sprayed inside to remove the dust particles deposited in the internal portion, after that water with air mixture will be sprayed inside to remove remaining deposited parts. To make inside dry, a warm air will be sprayed inside which is supported by the heater.

IV. COMPONENT DISCRIPTION

Design and fabrication of portable vehicle cleaning machine consists of the following components, to full fill the requirements of complete operation of the machine.

1. Pneumatic rotor.
2. Pump.
3. Nozzle.
4. Scrubber.
5. Handle.
6. Compressor.
7. Sensor.

DESIGN SPECIFICATIONS

DESIGN OF NOZZLE:-

SELECTION OF NOZZLE: (flat high pressure even nozzle) Provides high and uniform impact capabilities. Even spray pattern eliminates to need to overlap patterns from adjacent nozzles.

Spray angle – 5* to 65*

(i) To find jet nozzle velocity (V):

Q = AxV

Where,

Q = discharge

A = area of existing nozzle

V = velocity

Now,

$A = \pi/4 \times d^2$

$= \pi/4 \times (1)^2$

$= 0.7853\ m^2$

(ii) Q = 300 LPM

300 lpm – 8.34x10^-5 m^3/sec

V = Q/A

= (8.34x10^-5/0.7853)

= 95.43 m/sec

Velocity of nozzle (v) = 95.43 m/sec

SPECIFICATIONS OF COMPONENTS

1. DC MOTOR:

Weight (W) = 150g

Outside diameter (O.D) = 15mm

Inside diameter (I.D) = 5mm

Lift (H) = 130cm

Flow rate (Q) = 300 l/sec

2. COMPRESSOR:

Air flow (Q) = 35lit/min

Max Amperage=15A

Max Running=12-15min

3. WHEEL:

Diameter (D) = 15mm

Wight (w) = 100kg per set

4. SCRRUBER:

Length (L) =24Cm

Width (W) =6.5Cm

Breadth (B) =0.25M

5. BEARING:

Material = chrome steel – SAE 5210

Center diameter = 5mm

V. MERITS & DEMERITS

- The car bottom area can be easily washed.
- Handling is easy.
- Less manual power.
- Less power consumption.
- Impressing task in huge apartment, houses etc…

VI. CONCLUSION

Our project have been designed with the required input from the customers, and the need for the problem. After various design, the optimization have been carried out and the final model is taken for the fabrication.

The project carried out by us made an impressing task in the automobile industries. It becomes much useful for the peoples to clean the vehicle, additionally it is used to clean huge apartment, houses etc..,

Even though the project is optimized and solved the purpose, the cost of manufacturing is comparatively less and hence become cost effective.

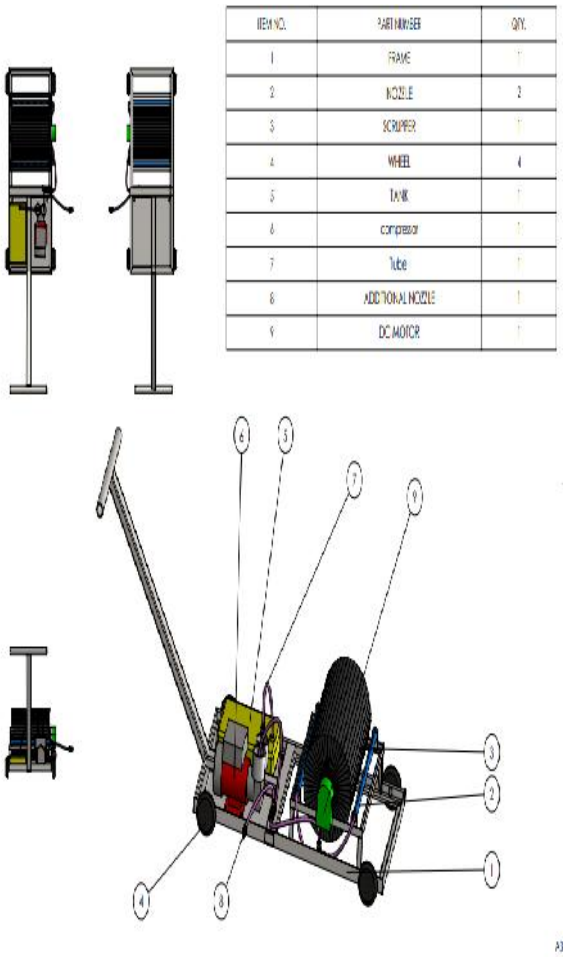
REFERENCES

[1] Design data book - P.S.G.Tech.
[2] Pneumatic handbook -R.H.warrning
[3] Machine tool design handbook – Central machine tool Institute, Bangalore.
[4] Strength of Materials - R.S.Kurmi
[5] Manufacturing Technology - M.Haslehurst.
[6] Design of machine elements - R.S.Kurmi
[7] Website 1 - http://advantage-me.com/products-carcleaning.html
[8] Website 2 - https://sandiego-autodetail.com/interior-car-detailing-advantages
[9] Website 3 –

https://www.google.com/amp/s/www.autoguide.com/best-car-cleaning-products/%3famp

[10] Website 4 - https://www.homestratosphere.com/types-of-car-wash-tools/

DRAWING



ITEM NO.	PART NUMBER	QTY.
1	FRAME	1
2	NOZZLE	2
3	SCRUPPER	1
4	WHEEL	4
5	TANK	1
6	compressor	1
7	Tube	1
8	ADDITIONAL NOZZLE	1
9	DC MOTOR	1