

Automated Car Cleaning Device

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Abstract- *The project work addresses the development of a Portable automatic car cleaning device. The reason for this development has arisen because there are many automatic car cleaning devices but they are difficult for installation and are not portable if portable not automatic, so we designed and built a device which is easy to install, portable and automatic too. The device gives an external wash to the car by water. The device consists of DC motor connected to many other components such as speedometer to control the speed of the device, relay to change the direction of rotation of dc motor, crank mechanism is used to change the direction of rotation of the device and to increase the load carrying capacity. Holes are made on pneumatic pressure pipes through which water flows from pump and cleans the car. Car battery is used as power source to the device.*

Keywords- Automatic, car cleaning, portable.

I. INTRODUCTION

Car cleaning is essential function of preventive maintenance, keeping the exterior of vehicle clean, prevents rust & oxidation and it also reduces the occurrence of fine scratches. There are many types of car washes some of them are hard car wash where the vehicle is washed by employees, in manual car washing system it requires more of labour effects, time consumption and also results may not be satisfactory. According to this research, they proved that hand washes are extremely harmful to automobile finish. It can produce scratches that penetrate as deep as 1/10 of the total thickness of its paint. So many car cleaning machines were introduced in the market to wash the car in the best and safe way.

II. LITERATURE REIVEW

“Implementation of Auto Car Washing System Using Two Robotic Arms” by Pranoti Utekar, Sayali Naik, Monika Wadekar, S.G. Watve, Vol. 4, Issue 4 April 2015 the main objective of this paper is to perform exterior car washing automatically using two Robotic Arms. The system consists of two robotic arms, one mounted at base of longitudinal wall and other on the ceiling. The car whose surface is to be cleaned is stationed onto a rotating platform. Robotic Arm1 is

used for cleaning the sides of the car. It consists of a circular brush at the end of the arm. The arm rotates and captures the wheel base, with rotator movement of the circular brush it cleans the wheels. The remaining surface is cleaned by a wiper like movement of the arm. Robotic Arm2 is used for cleaning the front and back of the car. It is so programmed that it can travel along the surface to wipe it. Both the arms will work according to the inputs from GUI

“Automatic car washing system using PLC”^[1] by Zeenal Lalluwadia, Nidhi Bhatia and Jayana Rana, February 2017, Volume 3, Issue 9 the main objective of their device is to develop a car wash system where more than one car can be washed at a time using PLC system. The car washing system has three main processes namely washing, cleaning and drying, hence the exterior of the car will be washed by detecting the car on conveyor belt and further controlled by PLC & SCADA. The components used are proximity sensor, PLC, conveyor belt, solenoid valve, motor. PLC is used because it is a specialized computer, used for the control and operation of manufacturing process and machinery. It uses a programmable memory to store instructions and execute functions including on/off control, timing, counting, sequencing, arithmetic, and data handling.

“Robot Arm Type Automatic Car Washing Device”^[2] by Yoshiaki Takida he developed a robot arm type automatic car washing device adapted to automatically wash an automobile vehicle by vehicle washing rotary brushes mounted at the front ends of robot arms is so designed that a vehicle left-side washing rotary brush mounted on a vehicle left-side washing robot arm and a vehicle right-side washing rotary brush mounted on a vehicle right-side washing robot arm wash mainly the vehicle left-side and right-side, respectively, to thereby perform vehicle washing process while automatically controlling the vehicle washing rotary brushes respectively mounted on the front ends of the robot arms by a vehicle automatic washing device main controller on the basis of input data in the form of vehicle actual measurement size data measured by analysing the vehicle image data by the vehicle automatic washing device main controller, the vehicle image data being prepared by photographing using a vehicle front, left, right, top, rear surface photographing camera.

III. OBJECTIVES

- To design and build a portable car cleaning device, Using of car battery as a source.
- Minimal usage of water. No overhead tank is required, any source of water is sufficient.
- The high-pressure intensity of water helps in easy removal of mud or sticky substance.
- As the links can be folded it is easily portable.

IV. METHODOLOGY

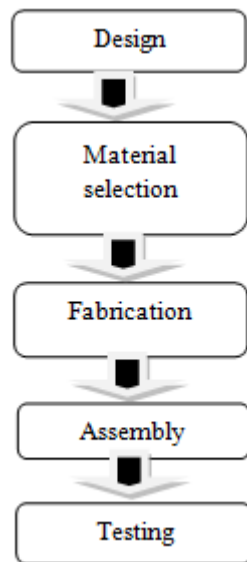


Fig 1 : Flow chart of methodology.

V.COMPONENTS

DC MOTOR

An electric motor is an electric machine that converts electrical energy into mechanical energy. There are two kinds of motor AC motor which uses alternating current and DC motor which uses direct current. A simple DC motor typically has a stationary set of magnet in the stator and an armature with a series of two or more winding of wire wrapped in insulated stack slots around iron pole pieces with the ends of the wires terminating on a commutator.

DIAPHRAGM PUMP

A diaphragm pump (also known as a Membrane pump) is a positive displacement pump that uses a combination of the reciprocating action of a rubber, thermoplastic or Teflon diaphragm and suitable valves on either side of the diaphragm (check valve, butterfly valves, flap valves, or any other form of shut-off valves) to

pump a fluid. When the volume of a chamber of either type of pump is increased (the diaphragm moving up), the pressure decreases, and fluid is drawn into the chamber. When the chamber pressure later increases from decreased volume (the diaphragm moving down), the fluid previously drawn in is forced out.

PNEUMATIC PIPE

Pneumatic pipes are used for connecting the nozzles and the pump, so that water can flow through the pipe easily with minor losses and the nozzles are attached to this pipe as per the requirement of the device. For the device a pneumatic pipe of 10 meters long is used, the pneumatic pipe of 6mm outer diameter & 4mm inner diameter is used

METAL FRAME

A metal frame is used to provide stiffness to the body and to add some weight to body. The bolts are used connect the frames.

ELECTRONIC CIRCUIT BOARD

An electronic circuit board is used in the equipment which functions and controls the movement of the DC motor and also the water pump. The electronic circuit board consists of speed controller

SPEED CONTROLLER

An electronic speed control follows a speed reference signal (derived from a throttle lever, joystick, or other manual input) and varies the switching rate of a network of field effect transistors (FETs). By adjusting the duty cycle or switching frequency of the transistors, the speed of the motor is changed. The rapid switching of the transistors is what causes the motor itself to emit its characteristic high-pitched whine, especially noticeable at lower speeds.

VI. WORKING PRINCIPLE

The dc motor is connected to a chain sprocket, which connected to crank mechanism. Crank mechanism helps in rotation of the device. Pneumatic pipe is passed through the metal frame through which water flows from the pump and cleans the car. The metal frame is made flexible by connecting bolts to it. Holes are made on pneumatic pipes for water spray on the car. When the device is switched on the dc motor rotates the device 90 degree and same rotation in opposite direction. The water is sprayed on the car during the rotation which cleans the complete car.

VII. DESIGN OF CAR CLEANING DEVICE

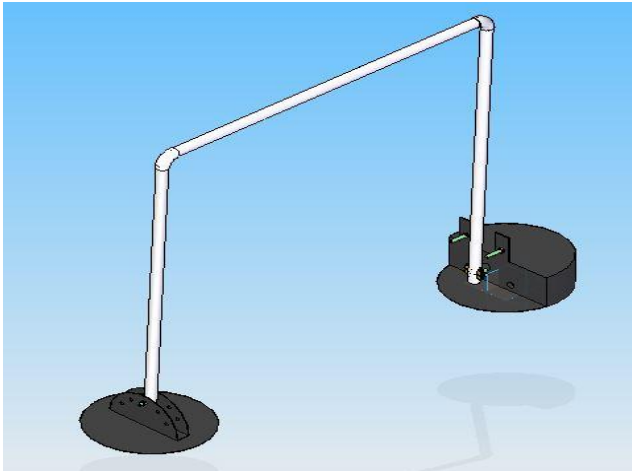


Fig2: 3D model on solid edge v19

2-D Diagram with Sectional views

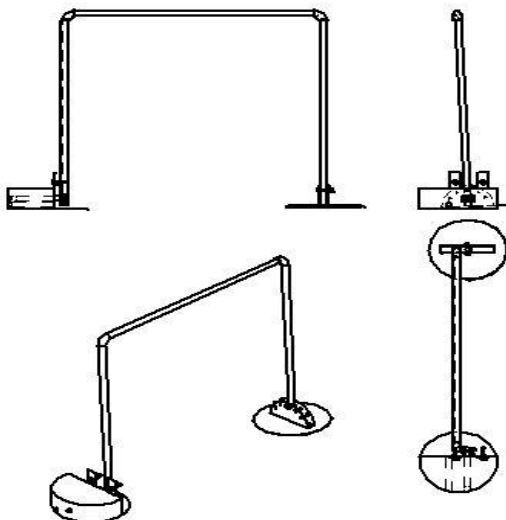


Fig2:2D sketches of different views of model

VIII. RESULTS AND DISCUSSION

- The exterior wash of the car can be made by using as low as 6 litres of water.
- This design can be used to clean any car just by increasing or decreasing the size of the frame as per dimensions for that car.
- Dust, mud and minor stains can be cleaned easily using this device.

IX. CONCLUSION

A car, 6liters of water and this device is enough to clean the body of the car as the entire setup made in such a

way that it can function with the normal car battery as the power source.

This project can also be enhanced by using a compressed air to blow of the water after car wash so that the car can be made dry.

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