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DESIGN AND DEVELOPMENT OF UNDERGROUND SEWAGE LINE CLEANER

Ashutosh Sahu, Aman Chandrakar, Suraj Pandey , Sourabh Yadav

Professor Dr. Nagendra Tripathi

Sr. lab instructor R. Srinivas Rao

Department of Electrical Engineering

Bhilai Institute Of Technology Durg Chhattisgarh, India

Abstract

Cleaning Sewers manually is a profession in India that has been banned but still persists. Till this date there are many parts of country where a person has to step into the underground sewage line to clean it conventionally with hand. This paper presents the study and design a electric underground sewage cleanermachine for the purpose of identifying the blockage and clearing it for the smooth functioning of drain pipes. This machine is a portable easy hand tool whose energy can be supplied by dc source.

The designing and analysis of this machine will help in achieving the vision of automatic sewage cleaning in India. It will also reduce the requirement of manual labour significantly.

Introduction

The conventional method of sewage cleaning involves a person (manual scavenger) stepping into the drain pipes and cleaning the pipes with hands or using some tool. The main risk involved in this method is the presence of harmful and dangerous gases (like Hydrogen Sulphide H_2S, ammonia, methane and nitrous oxide) which can severely affect the lungs and even death if not handled properly. The machine contains a vehicle like structure with 4 wheels with a rotating blade like structure at front of vehicle for clearing path and removing obstacles. This project is a model of DESIGN AND DEVELOPMENT OF UNDERGROUND SEWAGE CLEANERusing DC supply (12V-5A) as the main power source of it. In addition this is a innovative idea inspired from therobpwars vehicle. This prototype has been built to beat the drawbacks of the traditional sewage cleaning methods and to reduce the risk to lives of people involved in cleaning process.

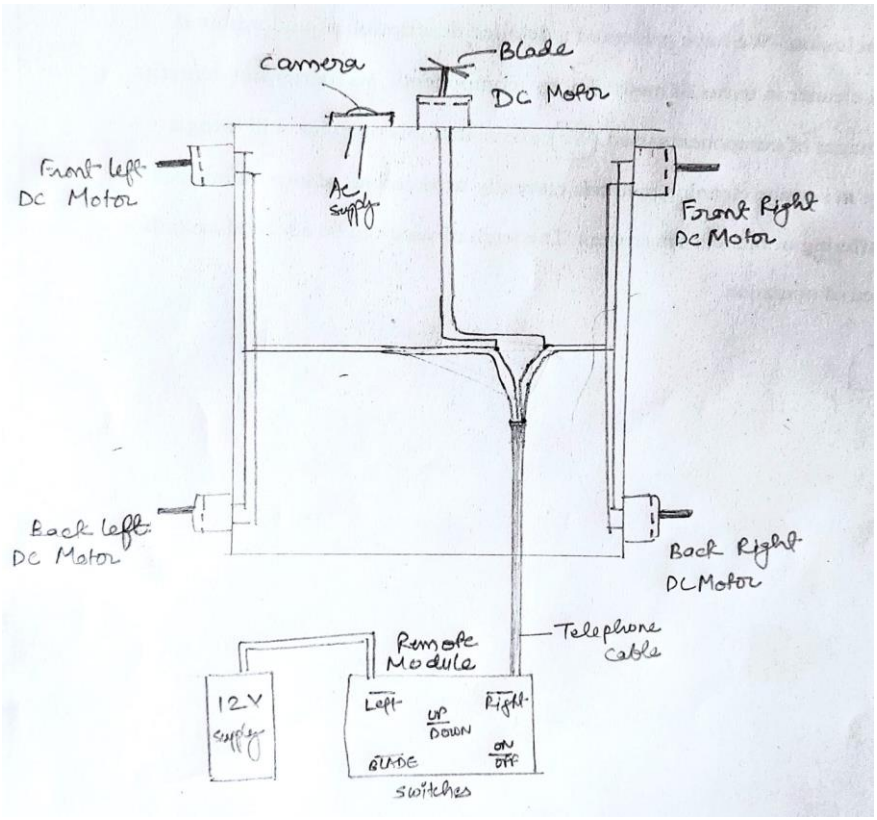
Principle

A four wheel drive car is equippedwith 12v-dc supply which is use to supply the dc motors installed in the chassis and by making circuit connections to operate through a remote module. Another dc motor is used for grinding purpose. With the help of double pole double throw switches the car is operated .

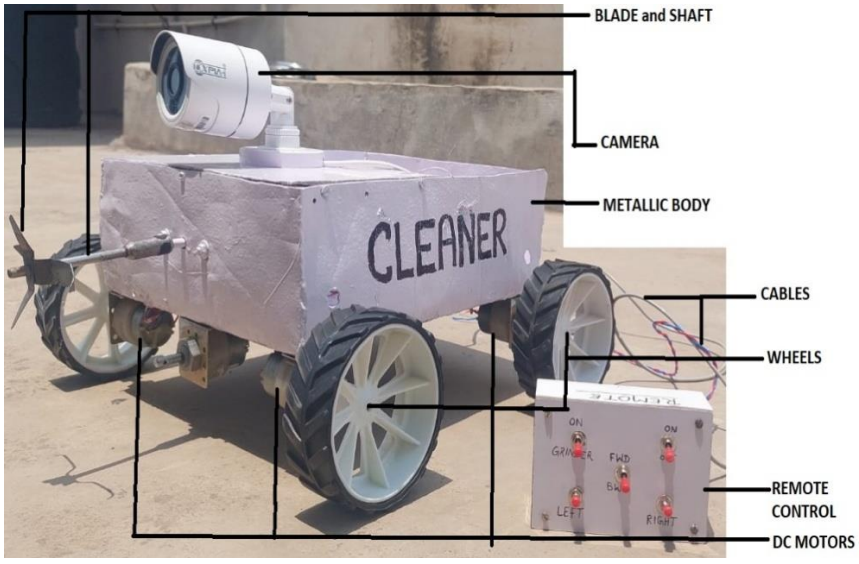
Methodology

- First a metal structured is formed using a 2mm iron sheet by giving it a car like shape with the help of iron welding and gas welding
- Different motors (dc motor, universal motor) are placed in the metal body
- For tightening for motor iron angles are used
- Whole supply can be given by a dc supply of 12v, 5amp
- Connecting wire is a telephonic cable of 2-pair is used
- By making the connection of motor with a remote control is then setup
- Then a cctv camera is installed above the main body which uses a DVR box and cat6 cable for its viewing purpose
- Then finally a blade according to over requirement is added in front of the main body for destroying the obstacle

Circuit Diagram



Diagram



Working

Mobility of system: The system has the motors that controls the motion of the car with the pipe. There are 2 motors that are connected to 4 wheels 2 at the front and 2 at the back.

Cleaning system: the cleaning system consist of the powerful cleaning universal motor that is connected to the front face of the car.

Wired control: Wired control system is responsible for the communication between the robot and the operator.

Video feedback: This system contains a camera to the give live status.

Result

Hence the machine is tested successfully in an underground sewage line of diameter (75cm) And it has cleaned the leaves, plastics, wastes which were stuck inside the sewage line.

Conclusion

We have presented a detailed description of underground sewage cleaner in terms of methodology, components, its merits and demerits with images of components used. We believe that this machine will bring a change in sewage cleaning methods currently used and more importantly reduce the suffering of manual scavengers. The length of wire can be adjusted according to need of operation.

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