

Wall Painting Robot

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Abstract: Wall Painting robot is the machine which we can use for painting walls of the houses, offices, hospitals, etc. Wall painting robot is made just to overcome the conventional methods of painting, reduce human efforts involved in the whole painting process. It has a painting gun mounted on the reciprocating arm of the robot, which is pneumatically operated. The gun has upside down reciprocating motion around the wall. After completion of upside down motion cycle the robot moves across the wall through some calculated distance to paint the other patch of the wall. This motion is given to robot by means of chain sprocket mechanism, which is driven by a motor and the motor is controlled by using electronics circuit. As this system is easy in handling, it is applicable to various works for a wide range of structures without limiting work subjects.

Keywords : Wall Painting Robot, Structure

I. Introduction

The project is based on wall painting robot, controlled through programming simulation. Here we are going to develop a mechanism, which will run through the chain-sprocket and using Pneumatic mechanism, we can start our painting automatically by robot. One of the major part is the automation for providing good feedback and control of the mechanism consisting of motors and other mechanical devices.

This robot is simple and portable. The robot is designed using few mild steels square pipes, chain-sprocket, spray gun and a controller unit to control the entire operation of the robot. This robot is compact because of high speed and pressure capabilities they have. They also have a very small weight to power output ratio and predictable performance i.e. losses are minimum due to less number of moving parts and so gives expected performance. It has longer life, flexibility and it is efficient and dependable, and the installation is simple and the maintenance is also easy. Some of the conditions that have to be considered while using this robot is that the system operates in pneumatics, so it needs air tank or compressor.

The development of service robots became popular recently due to the fact that the society needs robots to relax humans from tedious and dangerous jobs. In Egypt, as well as other developing countries, the increasing population stimulates the construction-related activities such as interior finishing and painting. Painting is classically done by humans and generally requires exhaustive physical efforts and involves exposure to dangerous chemicals. Chemicals can seriously impair the vision, respiratory system and general health of the human painter. These factors make painting an ideal candidate process for automation.

II. Problem Statement

Generally in India or in many other countries we use conventional method of painting is by applying paint on walls manually with the help of workers. Automation industries use machines for painting of their products and those are very much feasible because the production rate is high. Now we have to develop a robot which we can use for the purpose of painting of wall with the less initial investment and user friendly.

III. Simple Diagram

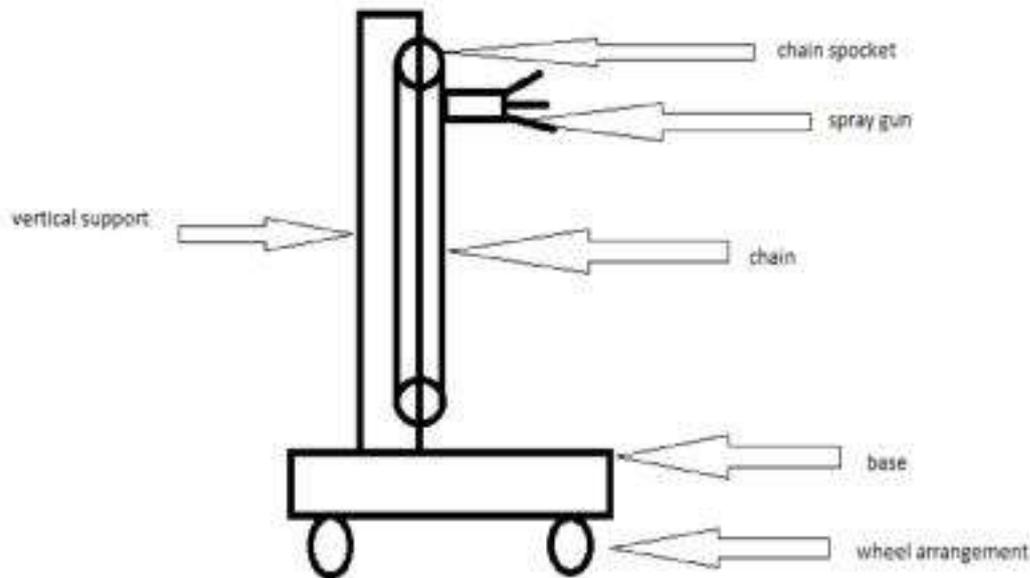


Figure : Basic Structure Of Wall Painting Robot

1. Frame-It is a base on which whole structure is mounted. Material for frame is mild steel. Square pipe are used for constructing frame.
2. Wheels-It is rotary device used for forward and backward motion of robot. It is made up of nylon.
3. Motor-It is electric DC motor of 12V. It is used to drive gearbox. There are 2 motors used.
4. Gearbox-It is used for transmitting power and motion from one shaft to another shaft. Worm and worm wheel is used for reduction of speed.
5. Chain & Sprocket-It is also power transmitting device. It is used for up & down motion of spray gun which is mounted on it.
6. Shaft-It is rotating machine element which is used to transmit power from gearbox to wheel.
7. Spray gun-It is used for spray the paint on wall. We also give controlled motion to spray gun.
8. Bearing-It is part of machine that allows one part rotate over another or move in contact with another part with as little friction as possible. Ball bearings are used.

IV. Working

Wall Painting Robot consist of various parts such painting gun/nozzle mounted on the the reciprocating arm of the robot. The gun/nozzle has upside down, reciprocating motion around the wall. After completion of upside down motion cycle the robot moves across the wall through some calculated distance to paint the other patch of the wall.

It consist of transformer so as to convert the DC supply of current to AC. When AC supply is provided to robot through transformer it starts performing the task of painting the wall in such a way that the spray gun moves up side down which is filled with paint with the help of chain sprocket.

Counter balance weight is attached so as to balance the weight of spray gun which moves on chain sprocket during assembly. After performing the up side motion whole assembly is shifted in forward direction at some distance which is programmed in it. Gear arrangement is used so as to control the speed of chain sprocket i.e spray gun during operation.

With the help of gear arrangement the paint which is sprayed on walls can be controlled in up and down motion. In this way wall painting robot can be operated so as to paint the walls with reducing human efforts.

V. Objectives

Now talking of the automatic wall painting robot. Some of the reasons we wanted to automate this process were:-

1. To save human efforts and improve throughput.
2. To reduce the environmental risks on human lives.
3. To overall raise the quality of work.

In other words, we are developing a painting machine for wall painting, but it needs to be incorporated with automatic features of robotics. So in this paper we will go through the possibilities to reproduce drawings on interior walls, just as paper sheets are printed by printing machines. We started off by programming the arduino to some basic functionalities and then establishing its connection with the bluetooth module. Automation is the use of machines, control systems and information technologies to improve productivity in the production of goods and delivery of services. The appropriate reason for applying automation is to boost up productivity and quality beyond that possible with current human labor levels so as to realize economies of scale, and realize predictable quality levels. The inappropriate application of automation, which arises most often, is a tendency to eliminate or replace human labor. Simply because, correct application of automation can net as much as 3 to 4 times original output with no increase in current human labor costs.

VI. Conclusion

Special robots and automation technology have the potential to increase productivity by performing tasks efficiently and improving working conditions through applications that limit the exposure of humans to safety hazards. Our project is a prototype model for providing automation in painting, texting and drawing using PIC microcontroller. And also it reduces space by using. Thus this process seems to be easier when compared to others.

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