

Wall Painting Mechanism

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Abstract— This project is developed for the user control a Spray Painting Mechanism through Computer. The main module in this project is Personnel computer, Computer Interface, Controlling circuit, Mechanism and painting device. The user can control all the operations of the Mechanism using computer. When the user presses a specific button of the computer, a digital signal is generated and sent through a particular pin of the parallel port. This signal is thus used to drive a corresponding relay in the external electronic circuit. The relay is used as a switch to operate the particular motor in the device. By this way the user can control any of the operations of the device.

Key words: Mobile Base, Wall Painting Mechanism

I. INTRODUCTION

In the 19th century, industrial revolution takes place. After that industries are developed on the large scale. Products are required to produce by the mass production techniques to reduce the cost. For that purpose different techniques are developed. As many processes have to take place simultaneously, there is need for the help in working. For doing different work we need help. Special purpose machines are developed for this. In the perforation of different work for that Mechanism is defined as a device or machine which works according to our order. Our order should be completed in time with precision so the term called Mechanism comes into play. "Mechanism – A servant play's important Role in it"

In the field of Technology, every day a new technique is ruled. It has his own characteristic due to which we have to adopt it. Today is the World of "New Technology" which we have to take in practice. Mechanism is one of the areas in the development. Mechanisms are widely used in the Mechanical field. In the mechanical Industries, Mechanisms are widely used for the art of wing assembly, material handling, coating facility, manufacturing processes (cutting, drilling, welding etc.). Mechanisms could accomplish many Boring repetitive task for us. Mechanism can do hazardous jobs and can reach places where it's difficult for human beings to reach. Mechanisms, which substitute the manned activities in space, are known as space Mechanisms. Mechanisms are desirable for certain work functions in industries because, as unlike humans, they never get tired; they can endure physical conditions that are uncomfortable or even dangerous; they can operate in airless conditions also; and they cannot be distracted from the task at hand.

A. Remote Compressed Air Tank:

The main disadvantage of our Mechanism is that, the compressed air should be supplied to the Mechanism at every location when it moves from one position to another. We have to supply this compressed air by using the pneumatic hose.

If there is a compressed air supply tank which can move along with the Mechanism, the above problem can be

overcome. But it will increase the load to be carried with the Mechanism. But the Mechanism can cover any distance and it can go at any desirable position. When compressed air tank become empty it can be again recharged with compressed air.

B. Walking Mechanism:

Instead of using the wheels for the locomotion, we can make the walking Mechanism. If the obstacle came in the path of the wheeler Mechanism it could not move. But we can use the walking Mechanism in that case very effectively.

C. Problem Statement:

Building and construction is one of the major industries around the world. In this fast moving life construction industry is also growing rapidly. But the labors in the construction industry are not sufficient. This insufficient labor in the construction industry is because of the difficulty in the work. In construction industry, during the work in tall buildings or in the sites where there is more risky situation like interior area in the city. There are some other reasons for the insufficient labor which may be because of the improvement the education level which cause the people to think that these types of work is not as prestigious as the other jobs. The construction industry is labor-intensive and conducted in dangerous situations; therefore the importance of construction The Mechanism has been realized and is grown rapidly.

D. Objectives

The principle features of this painting mechanism are as follows.

- 1) It maintains painting quality which cannot be distinguished from the quality of skilled painting personnel.
- 2) Painting by manual labor on high scaffolding, as done previously, is eliminated, the work efficiency is high And there is little danger.
- 3) Uneven walls with indentations and protrusions can also be painted automatically.

E. Components

1) Mobile Platform

- Frame stand
- Wheel

2) Spray Gun Mount

- Sprocket
- Flow control valve
- Spray gun

a) Frame Stand and Wheel

The frame stand is the steel welded in such a way that it can carry the whole equipment. The steels are welded strongly in welding laboratory with an idea to carry the entire mechanism with the control unit, battery and DC motor in the mobile platform and the IR sensor, solenoid valve and spray gun in the roller shaft .Four wheels are attached to the frame stand in order to move the mechanism in the direction

specified. The movement of these wheels is controlled by the DC motor rotation which is controlled by the microcontroller. Since it is obvious that if either the movement of front or back wheels are controlled automatically the movement of the other one will be controlled. Therefore, in this mechanism the movements of the back wheels are controlled using the DC motor such that the movement of entire mechanism is controlled.

F. Gear Wheel Mechanism:

The spur gears, which are designed to transmit motion and power between parallel shafts, are the most economical gears in the power transmission industry. The spur gear arrangement is used to move the conveyor in forward and direction.

G. Working System Requirements:

At first, we have to make explicit statement about the assumptions needed for the mechanism operation and can be summarized as follows:

- 1) The mechanism moves on flat terrain and no inclination.
- 2) The painting wall is vertical, smooth and flat without any obstructions, such as windows or hangers.
- 3) The painting fluid is supplied by a human user to a tank in the mechanism.
- 4) Roller maintenance and cleaning is also left for user.
- 5) The walls to be painted are instructed by the user through a suitable interface.

The motion requirements of the mechanism arm is shown in Fig.1 which shows the basic need to move the roller vertically for painting and the need for horizontal motion to make direct contact with the wall and to depart from the wall. Figure 2 shows the motion requirements of the mechanism base for placement of the whole mechanism and maneuvering. The mechanism needs to move parallel to the wall to make lateral feed motion and to move normal to the wall to start and depart the painting process. The need to rotate is essential to adjust the mechanism orientation against the wall. The system requirements and specifications can also be summarized as follows, the mechanism should:

- 1) Paint the walls in a once-through fashion Vertically from top to bottom.
- 2) Be stable and not to flip over during painting or maneuvering.
- 3) Paint the walls and the ceilings.

1) Mobile Base

The mobility requires fitting the arm on a mobile base, and referring to Fig.2, it is required to have 3 DOF as indicated that is two planar moving directions and one for rotation to adjust mechanism pose relative to the wall plane. Although a simple two wheel differential drive can achieve these motion requirements, it will take long time for the mechanism to make the lateral feed motion after each vertical roller stroke. Therefore, it is better to use the three wheels or four-wheel arrangement. Although three-wheel arrangement seems a good choice, in the sense of easier control, but due to the expected high loading on the wheels whether due to weight or dynamic forces of painting, the wheel slip page will be problematic. Hence four independently driven wheels is the preferred choice

although this will complicate the control algorithm, but it will ensure suitable system maneuverability during the painting process. With four individual motors for every omni-directional wheel, this mobile mechanism can change its orientation while its translational motion.

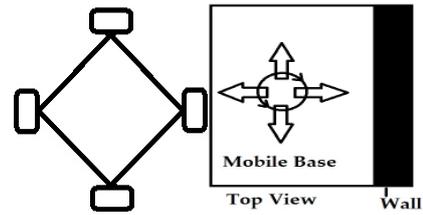


Fig. 1: Mobile base

J. Methodology

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II. CONCLUSION

In this report, we developed a branch and bound approach which is coupled with quick, effective bounds to optimize the movement of a mechanism

The design of control architecture was an important aspect of study because a strong interaction between the many different parts was needed. We know that the mechanism developed by us cannot be directly used on the factory floor because of some limitations. But we have provided the option for working of the mechanism as the compressed air from compressor which is readily available in the factory with low running cost. So we are satisfied with our project

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