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Design and Fabrication of Portable Spray Painting Machine

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***Abstract*: The initial aim of the project is to design, develop and utensil spray painting machine which helps to resolve low-cost painting attachment. The advances in machining and its wide spreading application, object painting has shared little in research activities. The painting chemicals has can cause unsafe to the human painters such as eye and inhaling system problem. Also, the nature of painting procedure that require repeated work and hand rising make it boring, time and effort consuming. When construction workers and robots are properly combined in object painting task, the whole architecture process can be better managed and saving in human labour and timing are obtained as consequence. These factors motivate the development of a portable advanced Spray-painting system. Painting is an mode of creative expression, and the forms are numerous. Drawing, composition or abstraction and other aesthetics may serve to manifest the expressive and conceptual intention of the practitioner. Painting can naturalistic representational (as in a still life or landscape painting), photographic, abstract, be loaded with narrative content, symbolism, emotion, or be political in nature. Here we show our innovative topic, in which we use compressor air pump pump for building up the pressure up to 2kg/cm sq. Pressure store in tank and utilized for spray painting work.**

***Keywords*: Spray painting machine.**

1. Introduction

In this era, people have been living with busy schedule in this daily life. This is why we need brushless painting it reduces the work load or time and saves colours from wasting. Painting is the practice of applying paint, pigment, colour or other medium to a surface (support base). The medium is commonly applied to the base with a brush but other implements, such as knives, sponges, and air brushes, can be used. In art, the term painting describes both the act and the result of the action.

However, painting is also used outside of art as a common trade among craftsmen and builders. Paintings may have for their support such surface as wall, paper, canvas, wood, glass, lacquer, clay, leaf, copper or concrete, and may incorporate multiple other materials including sand, clay, paper, gold leaf as well as objects.

Spray painting technique where a device sprays a coating (paint, ink, varnish, etc.,) through the air into a surface. The most common types employ compressed gas usually air to automize and direct the paint particles. Spray guns involved from air brushes, and the two are usually distinguished by their size and the size of the spray pattern they produced. Airbrushes are hand held and used instead of a brush for detailed work such as photo retouching, painting nails or fine art.

Spray guns can be either automated or hand held and have interchangeable heads to allow for different spray pattern.

2. Literature Review

Mohammad Abdullatif et al., In this paper author describe the design and working of autonomous wall painting robots. The conceptual design of a movable painting machine to be used for interior walls of residential building had been described. the robot uses roller fed with liquid paint and keeps contact with the wall surface. The robot enables the roller to scan vertically as well as horizontally to the painted walls.

Dhaval Thakur et al., this paper gives basic information about small and medium scale industries manufacturing components have to paint for protecting from rusting so the spray application consumes maximum time and paint which required the skilled worker emerged with application. They cannot manage robotic arrangement for higher efficiency so the rise of the such process have to be made which is affordable, gives better accuracy, consumes minimum time for coating so objective has to developed such mechanism which coat the object with the dipping technique having semi-automatic arrangement which is suitable for our requirements and which can be valuable for small and medium scale industries.

P. Keerthanaa et al., They studied that automatically paint the wall surface of given dimension has been designed and implemented in effective manner. The approach uses Infrared transmitter and Infrared receiver to identify the appearance of wall. The microcontroller unit to regulate the movement of the DC motor. The robot is cost effective, reduces work force for labours, and reduces time consumption. The drawback of the project is that the robot continues painting later the end of the wall so it can be eliminated by adding some indicating objects such as alarms

Berardo Naticchia et al., In this paper, they shown that automated painting can be not only aimed at correcting productivity, but also quality checking. A robot arm with high

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precision is required. An automated system to convert the normalized coordinate soft he liquid colours to be reproduced into the movement speed of the robot end tool and valve opening end of the mixing board. Most of the work will be probably necessary to achieve high resolution. Because of the shape of full- scale robots, probably also the resolution of the human scale robot will be lower. Another particularity of the small-scale arrangement is of course the ability to access some hard places of buildings under construction, where human range robots could not be allowed.

Takuya Gokuya et al., They have shared that construction of wall-surface Operation Robot plan to automate and increase the efficiency a series of works by adding, changing of an attachment, new task for cleaning.

Pal Johan et al., In this paper, they present a technique for increasing the speed at which a standard industrial manipulator can paint a wall surface. The approach is based on the perception that a smaller or in the direction of the end effectors does not in fluence the quality of the paint job. It is far more important to maintain constant velocity throughout the orbit. In doing this, they cast the problem of finding the optimal orientation at each time step in to a convex minimized problem that can be solved efficiently and in real time. They show that aim to allow the end effectors to keep higher constant velocity throughout the orbit guaranteeing constant paint coating and substantially decreasing the time needed to paint the wall.

3. Problem Definition

According to literature survey only few of textile manufacturing and painters uses some variety of spray-painting machines in India. for painting lots of objects in industries and working sites through brushes it is a tedious process. As it takes more time and hard work than spray painting.so the time consumption for the other Painting also very high.

Other Painting styles occurs errors in painting like they give scratches and not look well finished. It cost more with brush painting, so that the manual hand brush painting is not time efficient as well as cost well suited for (painting) sites in industries.

4. Proposed Methodology of Solving Identified Problem

For painting one metal object manually with brush takes if 20-30 minutes, but the spray-painting machine hardly takes 5-6 minutes painting these metal object. And also, these brush painting process takes lots of paint to paint and wastage of paint occur. Bute the spray painting machines does not waste paint it takes same metal product to paint less than half a paint than brush painting process. If we take comparison between brush painting and spray painting, for 7 hrs. manual (420min) brush painting only paint 21 metal object, whereas spray painting machine can paint 84 metal object/product in same time (420 min).

Spray painting machine is cost well suited than other Painting mechanism. It is very useful for industries where painting work is done.

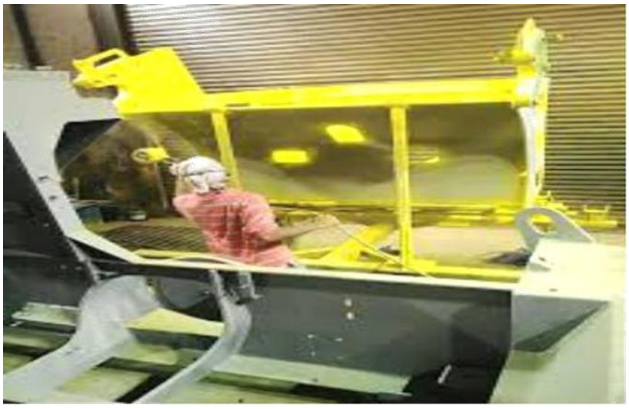

Fig. 1. Workman with spray painting machine

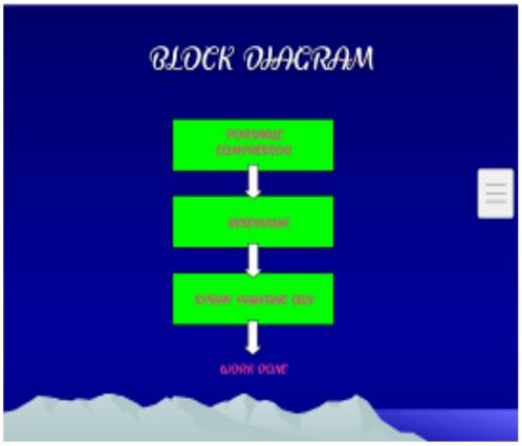

Fig. 2. Block diagram

Fig. 3. Hardware setup of the project

5. Parameters to Analyze

A. Time

When manually brush painting process takes 20-30 minutes to paint one metal object but with using this spray-painting machine that time is to reduce 15-17 minutes.

B. Wastage of colour and finishing

When we paint with brush, the paint of every metal object varies with the metal object and waste colour. But when a spray-painting machine paints that all objects the paint does not varies with any colour. It means that every metal object will give same

colour and well finished.

6. Expected Outcome

Table given below shows that time completed to paint 100 metal objects. From the given table it shows that by using spray painting machine, time to paint 100 metal objects will only take 8.5 hrs. (510 min) as compare to brush painting process which takes near about (2050 min) 34hrs. This clearly shows that the time saved by using the machine is approximately less than half an hour compares to 100 metal object paint with brush.

Table 1
Time taken to paint 100 metal objects

	Brush	**Spray**
Painting Time (min)	Nearby 20-30 min	Only 5-6 Min
100 metal objects (hrs.)	2050/min. Approx. 34 hrs.	510 min. Approx. 8.5 hrs.

7. Conclusion

The work carried out by us made an impressing mark in the field of painting department in manufacturing industries. It is very useful for the workers working in the painting department. This automatic spray-painting system reduces the overall cost of the spray-painting systems and it will help to perform the specific work with a short period of time.

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