

# Automatic Wall Painting Machine

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**Abstract** – The use of spraying robotized systems for interior painting was already shown to be feasible and convenient, a lot of experiments must be carried out in the future to deliver a highly autonomous robot for interior painting. We developed an exterior wall painting robot for the purpose of automating this painting operation. The robot is mounted on equipment which permits it to move up and down, left and right along the exterior walls of a building. It is computer controlled and is activated simply by the operator pressing a switch on the control panel located on the ground. Automatic Wall Painting Robot which helps to achieve less human interaction and low cost painting equipment. Despite the advances in robotics and its wide spreading applications, interior wall painting has shared little in research activities. Despite the fact that the utilization of spreading robotized frameworks for inside painting was at that point indicated to be attainable and helpful, a ton of tests must be completed later on to convey an exceedingly self-governing robot for inner part painting.

**Index Terms** – Addictive, Construction robot, Liquid, Paint, Painting roller, Painting storage tank.

## 1. INTRODUCTION

Mechanical “Paint is defined as a unique homogeneous mixture of three major ingredients namely Binder, Pigment, VOC and additives, which when applied on the surface as a thin layer that forms a solid dry adherent film after oxidation/evaporation/polymerization”.

- In the broadest terms, a paint consists of a particular pigment, dispersed in a particular binder, dissolved in a particular solvent.
- In general the corrosion protection afforded by a paint film is  $\propto$  to its DFT measured by Elcometer-an electro-magnetic induction gauge.

- Adhesion: the degree of attachment between film & the substrate.

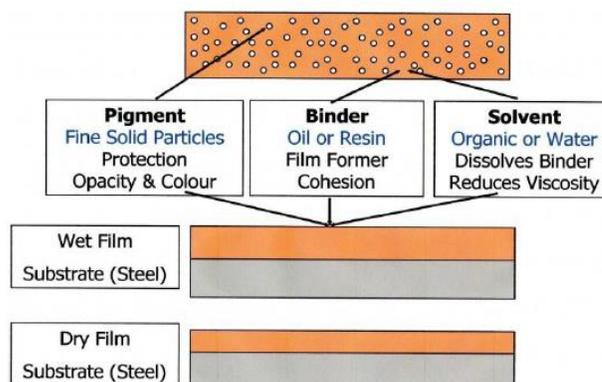


Fig.1 Ingredients of Paint

All paints require particular finely ground solid colour called pigments, a solvent or liquid vehicle which keeps the paint in suspension until applied, and a binder or resin that has the ability to dry or otherwise harden and adhere the paint to the surface for an extended period of time (Bently and Turner, 1997). The properties of paints depend on the relative amounts of the ingredients in the paint. A typical paint consists of 35% pigment and filler and about 21% film forming and other ingredients (Turner, 1998). There are natural, synthetic as well as organic and inorganic pigments. Early pigments were simply ground earth or clay. However, modern pigments are often sophisticated masterpieces of chemical engineering. Paint for application to brick masonry walls should be durable, easy to apply and have good adhesive characteristics. It should be porous if applied on exterior masonry, thereby permitting the wall to breathe and preventing the trapping of free moisture



**Base Frame:**

The Primary base frame is the base element provided with castor wheels, The primary base is made of mild steel square tube and mild steel plate. It supports the entire assembly of the spray paint system

**Vertical motion system:**

The vertical motion system comprises of the screw and nut, lifter screw held in two ball bearings and nut connected to the carrier. Rotation of screw is converted to translation of the spray paint system u or down

**Paint storage:**

Paint storage is done in a small tank of 0.8 to 1.2 liter capacity mounted on the structure. The compressed air is supplied through the chamber to carry the paint to the spray rotor end.

**Paint application:**

Paint application is done by means of a spray which is reciprocated in linear guide by crank and connecting rod mechanism operated by motor.

**Control circuit:**

The paint quality that is the thickness of paint will be controlled by the control the speed of the motor, so also the speed of the translation of the setup will be controlled by the speed of translation.

**Frame with castor wheels:**

This is base of the machine which enables transportation of the set-up or when applied with motorized motion can enable automatic translation while wall painting.

**Pinion shaft:**

Pinion shaft is mounted at its square end on the worm gear box output side, where as the pinion is held on the other side of the pinion shaft.

**Main shaft:**

Main shaft is held at one end in ball bearing 6003zz in the main bearing housing which is welded to the base frame. Where as the side stand is welded at other end of shaft.

**Holder bracket:**

Holder bracket is an standard forged part which hinges the side stand at one end, and spring arrester pin-1 is welded at the other end. This pin holds one end of the helical tension spring. The holder bracket is welded to the boom.

**Base frame:**

Base frame comprises of the base plate, boom, motor plate and the gear box plate. These are support members that hold the assembly together.

**DP/DT switch:**

The DP/DT switch is an electrical direction control switch which changes the direction of rotation of the motor and there by controlling the motion of the side stand.

**Bearing housings:**

The input and output bearing housings hold the ball bearings for respective base shafts and they are bolted to the base frame.

**Speed adjuster mechanism:**

The speed adjuster mechanism is in the form of an screw and nut arrangement, where in the screw is held in ball bearings at either ends and carries a nut which holds the belt guide mechanism in the form of free moving of the Gun.

#### 4. RESULTS AND DISCUSSIONS

The painting procedure specifies how to apply spray gun motions to the surfaces in order to achieve a satisfactory process quality. The procedure library is established through experimental work. The basic idea is to enable planning of paint strokes that continue throughout the parts even though different geometric primitives must be covered along the surface and even though continuous robot motions cannot follow the surface. The system will attempt to approximate the triangular patches of the surface model by larger plane regions (virtual surfaces), which are oriented in a few main directions. The generation of paint paths is divided into the following steps: planning of the painting process, planning of collision free spray gun motions specifies a trajectory of the spraygun, which satisfies the desired paint quality. In this module only spraygun motions are considered in relation to process quality. No restrictions of robots are made and collisions between the spray gun and its surroundings are not considered. The system uses the "Geometry Library" and the "Procedure Library" in order to plan this trajectory.

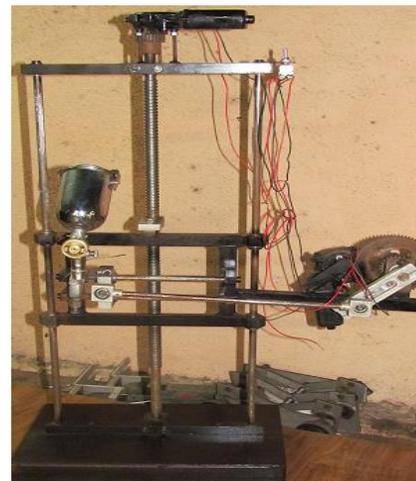


Fig.4 Final design of wall painting machine

## 5. CONCLUSION

A method has been developed for automatic spray painting of unknown parts. This machine is very useful for painting of any shape with very time period less. Accuracy of this machine is more as compared to manually painting. It also saves the labor cost and the total cost of painting the any jobs. The methods of painting and intends to enlighten readers and artists alike with knowledge of modern art techniques as well as forgotten techniques of the painting technology. By using the automatic painting machine it is clear that the human efforts are reduces as well as the cost of labor also reduces. Automatic Painting machine can also print the huge building easily and safely without any hazards to human being and labors.

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