

Design and Fabrication of Semi-Automatic Wall Plastering Machine

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Abstract- The purpose is to build a cement plastering machine, this machine is used for delivery of semi-solid cement by pumping system for cement plastering walls and ceilings. Today, the country's growth depends on the construction industries the construction of buildings requires extensive human and technical work. According to a 2018 survey in India, That's the jobs of nearly 8.5 million construction and other construction workers. India's work force is decreasing day by day due to the economics of the average worker. In this work, plastering is a prerequisite for wall decoration, so according to the need, it is to reduce the labor and time of concrete work and automatically provide wall plastering through mechanical work. We believe that the modern world requires new innovation sand cement mixture plastering technologies in the construction industry.

Index Terms: Wall Plastering Construction field, Cement plasters or Mortar.

I. INTRODUCTION

The working of this equipment is based on the concept of piston moves front and back by using pressure. This idea is all about the future demands in construction field. With this semi-auto plastering machine, it can be operated much faster than traditional plastering methods. The reason why this machine is more efficient in plastering walls because less labour and experienced or inexperienced workers can be used

The quality of work is generally depending on the aptitude of the labour work in manual applying of cement plaster. The plastering machine can mortar the dividers automatically and exceptionally easy. Due to which the method will quick and there will be saving of time. This will make a difference to decrease the full cost, total time which eventually dependable for the development and consequently the advance rate of a nation in planning.

II. OBJECTIVE

The main objectives of the machine as follows,

- To decrease the total time taken for applying the cement plaster process.
- To reduce the cost of labour.
- To get good surface finishing while applying the cement plaster.
- Very easy and simple to operate.
- Saving more than 20% raw material (cement and sand).

III. METHODOLOGY

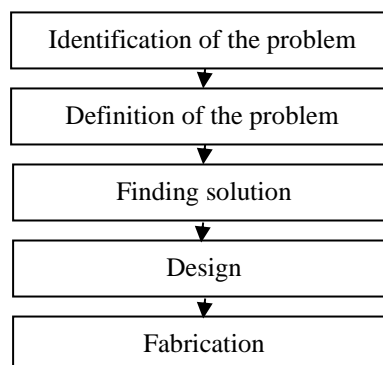


Fig. 1 Methodology

IV. COMPONENTS USED

The major components are, Gear, screw rod, chain sprocket, shaft, storage tank, supporting frame, plastering board.

Components Description:

Gear: The teeth on a spur gear are arranged in a straight line, which means that they transmit motion and power in a linear manner. They are designed to mesh with another spur gear of the same pitch, which means that the teeth on both gears have the same size and shape. When two spur gears mesh, the rotation of one gear causes the other gear to rotate in the opposite direction. Spur gears are typically made of metal, such as steel or brass, and are manufactured using a variety of techniques, including casting, forging, and CNC machining.

Screw Rod: A screw rod, also known as a lead screw or a power screw, is a mechanical component that converts rotational motion into linear motion. It consists of a threaded rod or shaft and a nut that contains matching threads. As the rod is rotated, the nut moves along the length of the screw, converting the rotary motion into linear motion.



Fig. 2 Screw Rod setup

Chain Sprocket: Chains are designed to transmit motion or power by meshing with a sprocket or gear. When the chain is driven by a sprocket or gear, the links move in a continuous loop, transmitting motion or power from one component to another.

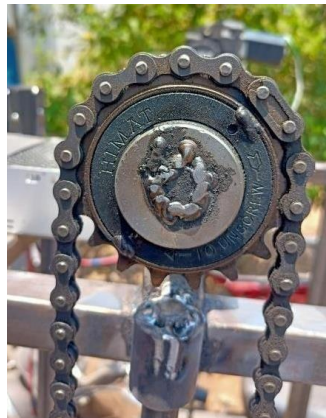


Fig. 3 Chain Sprocket setup

Shaft: Shafts are used to transmit power or motion in various ways, such as through gears, belts, or chains. They may also be used to support and stabilize other components, such as bearings or couplings. Shafts can be designed with various features, such as vibration damping, corrosion resistance, and low friction, to suit different applications.

Storage tank: The storage tank is an important component of a semi-automatic wall plastering machine, as it enables the machine to deliver a continuous flow of plaster or mortar to the wall. The tank also helps to ensure consistent quality and coverage of the plaster or mortar, resulting in a smooth and even finish on the wall. The tank is a component that holds the plaster or mortar mixture used for wall plastering. It is typically located on the top of the machine and is connected to the plastering machine that delivers the mixture to the wall through push rod. The tank is usually made of a durable material, such as plastic or metal, and is designed to be easy to clean and maintain.



Fig. 4 Storage Tank setup for mortar

Supporting frame: The frame of a wall plastering machine is a structural component that provides support and stability to the various other components of the machine. It is typically made of a strong and durable material, such as steel and is designed to withstand the stresses and forces involved in the plastering process. The frame is typically designed to be lightweight and portable, so that it can be easily moved to different job sites. It may have various features, such as handles or wheels that make it easy to manoeuvre and transport.

Plastering board: The frame of a wall plastering machine is a structural component that provides support and stability to the various other components of the machine. The frame of the machine is typically designed to be lightweight and portable, so that it can be easily moved to different job sites. It may have various features, such as handles or wheels that make it easy to maneuver and transport.

The frame may also include various mounting points and brackets for attaching other components of the machine, such as the motor, mixing pump, and plastering hose. These components are typically mounted securely to the frame to prevent vibration and ensure smooth and consistent operation of the machine.

V. WORKING PRINCIPLE

The machine is placed near the wall and attached with a clamp unit with plain surface area on the top of the machine. The concrete cement paste is poured into the storage tank of the machine which moves with the column area vertically. In order to ensure that the blade edges contact the wall surface equally, the machine is secured to the wall. Depending on the amount of wall dimensions to be given to the wall, the inclined column is adjusted to the desired inclination angle. The tank is lowered to the appropriate height. The push rod that slides on the inclined column tends to advance inward into the box as a result of the box upward movement the push rod within the box keeps the box shut and prevents paste leakage since it contains a plate and rubber cushion at the other end.



Fig. 5 Prototype model

Pressure is applied to the paste as it moves out of the slit on the other side of the box causing the paste to fall onto the blade surface. The plaster is pasted on the wall surface as the blades rest on it during the upward motion

VI. ADVANTAGES & APPLICATIONS

Advantages:

- 1) It takes less time to complete the work
- 2) Portable and easy processes
- 3) Low-cost method
- 4) Reduce the work time
- 5) It does not required professional labor

Applications:

- 1) Mostly used in construction industries.
- 2) Used to apply wall plasters for new construction walls.

VII. CONCLUSION

The semi-automatic wall plastering machine is special and possibly one form of automated plastering equipment ideally appropriate for the building industry. Plastering work smoothly finished will be nearly equal to the labor work. It takes very much less quantity for fabrication.

Semi-Automated plastering works with traditional cement mortar which brings it to as smooth, flat end with variable and adjustable thickness to suit each application. This wall plastering makes rendering easier, faster, and basic as compared to guide application. The existing work consists of making use of the mortar into the wall and additionally pressuring mortar with a making floor level. The mannequin has been developed and examined successfully.

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