

DESIGN AND FABRICATION OF MULTIPURPOSE MATERIAL HANDLING MACHINE

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Abstract—Comfort coupled with safety and simplicity is what man strives for. Our project has been to bring about both. The culmination of our effort has resulted in development of a new “Design & Fabrication of Multipurpose Material Handling Machine”. The project presents a basic as well as very professional treatment of the subject in a very comprehensive, based on learning effort and understanding capability of today as per their levels. The device is simple and comfortable. Basic calculation, drawing, designing is included in the project. The salient features of our machine can be listed as the mechanism used is very simple, easy for operation; no skill is required to operate the machine. Hydraulic cylinders are used at high pressures and produce large forces and precise movement. For this reason they are constructed of strong materials such as steel and designed to withstand large forces. Because gas is an expansive substance, it is dangerous to use pneumatic cylinders at high pressures so they are limited to about 10 bar pressure. Consequently they are constructed from lighter materials such as aluminum and brass. Because gas is a compressible substance, the motion of a pneumatic cylinder is hard to control precisely.

Keywords—Material; Hydraulic

1. INTRODUCTION

The device affords plenty of scope for modifications, further improvements & operational efficiency, which should make it commercially available & attractive. If taken up for commercial production and marketed properly, we are sure it will be accepted in the industry. Cylinders are linear actuators which convert fluid power into mechanical power. They are also known as JACKS or RAMS. Hydraulic cylinders are used at high pressures and produce large forces and precise movement. For this reason they are constructed of strong materials such as steel and designed to withstand large forces. Because gas is an expansive substance, it is dangerous to use pneumatic cylinders at high pressures so they are limited to about 10 bar pressure.

Consequently they are constructed from lighter materials such as aluminum and brass. Because gas is a compressible substance, the motion of a pneumatic cylinder is hard to control precisely. The basic theory for hydraulic and pneumatic cylinders is otherwise the same. Material handling equipment is mechanical equipment used for the movement, storage, control and protection of materials, goods and products throughout the process of manufacturing, distribution, consumption and disposal. The different types of handling equipment can be classified into four major categories. Transport equipment, positioning equipment, unit load formation equipment, and storage equipment. The major subcategories of transport equipment

are conveyors, cranes, and industrial trucks. Material can also be transported manually using no equipment

2. OBJECTIVE

1. To make a complete mechanical device: The idea is to make a device which does not use any electrical power so that it is fully independent of its electricity.
2. To make a device which is suitable economical for small Scale industries: taking in to consideration the cost factor this device is suitable for small scale as well as large scale industries.
3. Taking safety as a prime consideration: This device is safer in all aspects.
4. To build a device which can do various operations like glass handling and fork lift.

3. METHODOLOGY

1. Collected the information about the raw materials to be used in the project.
2. Design of the machine using Solid Works 9.0.
3. Collection of the spare parts.
4. Building of frame work and assembly of parts.
5. The result of machine verified and noted down.

4. DESIGN

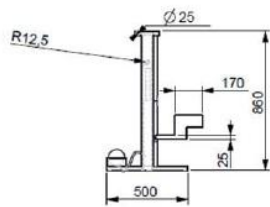


Fig.4.3: Side view 2D model.

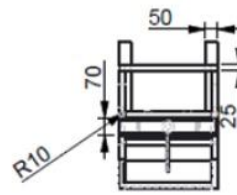


Fig.4.4: Top view 2D model.

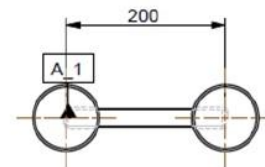
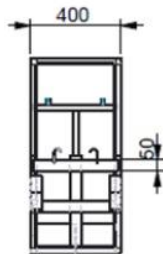
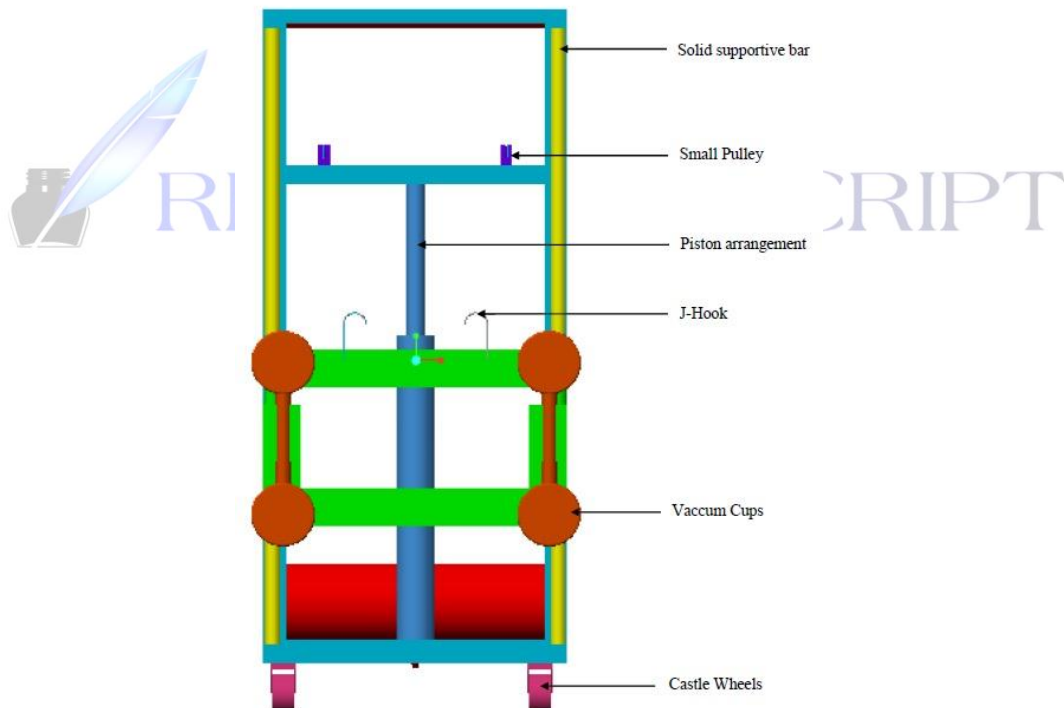


Fig.4.6: Front view of Vaccum cups.

5. 3D MODEL



6. RESULT

Consideration in Machine Design When a machine is to be designed the following points to be considered: -

i) Types of load and stresses caused by the load.

ii) Motion of the parts and kinematics of machine. This deals with the type of motion i.e. reciprocating. Rotary and oscillatory.

iii) Selection of material & factors like strength, durability, weight, corrosion resistant, weld ability, machine ability are considered.

iv) Form and size of the components.

v) Frictional resistances and ease of lubrication.

vi) Convince and economical in operation.

vii) Use of standard parts.

viii) Facilities available for manufacturing.

ix) Cost of making the machine.

x) Numbers of machine or product are manufactured.

7. CONCLUSIONS

1) The Purpose is to make a machine which does not use any electrical power so that it is fully independent of electricity.

2) Mainly the design was made to lift 100 kg but in practical it lifted 80 kg.

3) Biggest challenge is vacuum cup alignment with high suction force.

4) Maneuverability of device is good and handling of device is simple.

5) Future application like traverse movement of the sleeve where it cannot be reached manually

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