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Research Paper

Fabrication of Zig Zag Pneumatic Lift

Engineering

KEYWORDS : Pneumatic cylinder,piston,zig-zag frame

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ABSTRACT

This project is developed for the users to lift any weight using air pressure. High pressure air is stored in a tank. A cylinder with piston arrangement is connected with a zig-zag pattern. Two pipes connected with ball valves connect the air tank with the cylinder. When one valve is opened, the air rushes out into the cylinder. Therefore the piston moves in one direction. The rod connected with the piston pushes the zig-zag frame so that the lift moves up. When the other ball valve is opened, the air inside the cylinder is released. Therefore the lift comes down.

1. INTRODUCTION

1. 1 PNEUMATICS

Pneumatics is a section of technology that deals with the study and application of pressurized gas to produce mechanical motion. Pneumatic systems that are used extensively in industry and factories are commonly plumbed with compressed air or compressed inert gases. This is because a centrally located and electrically powered compressor, that powers cylinders and other pneumatic devices through solenoid valves, can often provide motive power in a cheaper, safer, more flexible, and more reliable way than a large number of electric motors and actuators

1. 2 Comparison to hydraulics

Both pneumatics and hydraulics are applications of fluid power. Pneumatics uses an easily compressible gas such as air or a suitable pure gas-while hydraulics uses relatively incompressible liquid media such as oil. Most industrial pneumatic applications use pressures of about 80 to 100 pounds per square inch (550 to 690 MPa). Hydraulics applications commonly use from 1, 000 to 5, 000 psi (6. 9 to 34. 5 MPa), but specialized applications may exceed 10, 000 psi (69 MPa).

1.3 Components used in for zig-zag pneumatic lift

The main parts of the zig zag pneumatic lift system are:

· Pneumatic Cylinder

· Single stage reciprocating air compressor

· Ball valves

· Atmospheric Pressure

2.ZIG ZAG PNEUMATIC COMPONENTS:

2.1 Operation

General

Once actuated, compressed air enters into the tube at one end of the piston and, hence, imparts force on the piston. Consequently, the piston becomes displaced (moved) by the compressed air expanding in an attempt to reach atmospheric pressure.

CAPACITY(kg)	Up to 20kg
COLOUR FINISH	Yellow with black
ASSEMBLY	Assembled
CONSTRUCTION	Steel
LIFE TIME	10 to 12 seconds
LOWERED HEIGHT	300mm
PLATFORM LENGTH	750mm
PLATFORM WIDTH	300mm
POWER	Pneumatic Air
RAISED HEIGHT INCHES	100mm
TYPE	Light-Duty Pneumatic Scissor Lift Table
WEIGHT	10kg
PRESSURE	6bar

Table 1.Specification of zig-zag pneumatic lift

4. CUTTING

Cutting is the process of using cutting tool to cut the work piece with. The continuous cutting produce burs during the process. Lubricant or coolant can be used for ease cutting and to cool the heat which is produced in work piece and the tool life can also be increased. Cutting can also be done in woods, metals, hard materials, etc.

5. WELDING

Welding is a fabrication or sculptural process that joins materi-

als, usually metals or thermoplastics, by causing coalescence. This is often done by melting the work pieces and adding a filler material to form a pool of molten material (the weld pool) that cools to become a strong joint, with pressure sometimes used in conjunction with heat, or by itself, to produce the weld. This is in contrast with soldering and brazing, which involve melting a lower-melting-point material between the work piece to form a bond between them, without melting the workpieces. Many different energy sources can be used for welding, including a gas flame, an electric arc, a laser, an electron beam, friction, and ultrasound.

6. CONSTRUCTION AND WORKING

This project is developed for the users to lift any weight using air pressure. High pressure air is stored in a tank. A cylinder with piston arrangement is connected with a zig-zag pattern. Two pipes connected with ball valves connect the air tank with the cylinder. When one valve is opened, the air rushes out into the cylinder. Therefore the piston moves in one direction. The rod connected with the piston pushes the zig-zag flame so that the lift moves up. When the other ball valve is opened, the air inside the cylinder is released. Therefore the lift comes down.

The main objective of Zig-Zag Pneumatic Lift project is developing a lift system for lifting any weight using air pressure. In this project, we stored high pressure air in a tank. A zig-zag pattern is connected with a cylinder with piston arrangement.

The cylinder and the air tank are connected by the two pipes with ball valves. When one ball valve is opened, the high pressure air will enter into the cylinder. Hence, the piston will move in one direction. The rod connected with the piston pushes the zig -zag frame so that the lift moves up. When we open the other ball valve, the air inside the cylinder is released. So, the lift comes down.

7. COST ESTIMATION AND DIAGRAMS

S.NO	Components	Quantity	Price(Rs)
1	Pressure cylinder with piston	1	4000
2	Zig-Zag Frames	1	1000
3	Ball Bearings	4	500
4	Vertical plate	1	250
5	Ball Valve	1	200
6	Bolts and Nuts	As required	50

Table 2. Costing



Figure 1 .Zig-zag pneumatic lift with air compressor

8. CONCLUSION:

We make this project entirely different from the other projects. The concept involved in our Project is very easy. We use pneumatic cylinder with piston attached inside and this cylinder is in turn attached to a zig-zag frame and when the compressed air is passed through the tube it makes the cylinder working and in return the lift will start to raise to its maximum height and when the air flow is made to stop then the lift will come back to its original position. By doing this project we understood the working principle of a zig-zag pneumatic lift their benefits, advantages and disadvantages.

We have successfully completed the project work at our institute.

Once again we express our sincere thanks to all our staff members who made our dream come true.

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