

Fabrication of Pneumatic Multi Purpose Machine

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Abstract – In small scale industries lot of operations like drilling, boring, grinding, etc... are to be done on the work piece. If we provide separate machines for each operation, it will require lot of investments and space also, so we selected the project titled "Fabrication of Pneumatic Multi Purpose Machine" to suit the requirements of small scale industries. It consists of a compressor, control unit, solenoid valve, pneumatic cylinders etc.. . The compressed air from the compressor is sent to the control unit .One part of the air is used to rotate the tool head by rotating the vane arrangements provided in the barrel. The other part of the compressed air is sent through the solenoid valve to feed the tool at regular interval. By changing the tool various operations like boring, drilling, tapping can be done by using this machine.

Key Words: Pneumatic vane motor, Direction Control Valves.

1. INTRODUCTION

The aim of this project is to convert Pneumatic power into Mechanical rotation and apply to do basic operations; this concept will make the use of compressed air which is most commonly used to clean the machine work place and to remove the burrs in the machined work piece. By using this concept additional electricity consumption can be reduced.

2. SCOPE OF THE PROJECT

This is a concept of utilizing the existing compressed air in the industry to perform the basic necessary operations like Grinding and burnishing.

3. COMPONENTS

- Pneumatic vane motor
- Direction control valve
- Double acting cylinder

3.1 Pneumatic vane motor

The vanes form working chambers, the volume of which increases in the turn direction. As the compressed air expands, the pressure energy subsequently transforms into kinetic energy, thereby producing the rotary motion.

3.2 Direction control valve

Directional control valves are one of the most fundamental parts of hydraulic and pneumatic systems. DCVs allow fluid flow into different paths from one or more sources. DCVs will usually consist of a spool inside a cylinder which is mechanically or electrically actuated.

3.3 Double acting cylinder

A double-acting cylinder is a cylinder in which the working fluid acts alternately on both sides of the piston. A double-acting hydraulic cylinder has a port at each end, supplied with hydraulic fluid for both the retraction and extension of the piston.

4. BLOCK DIAGRAM

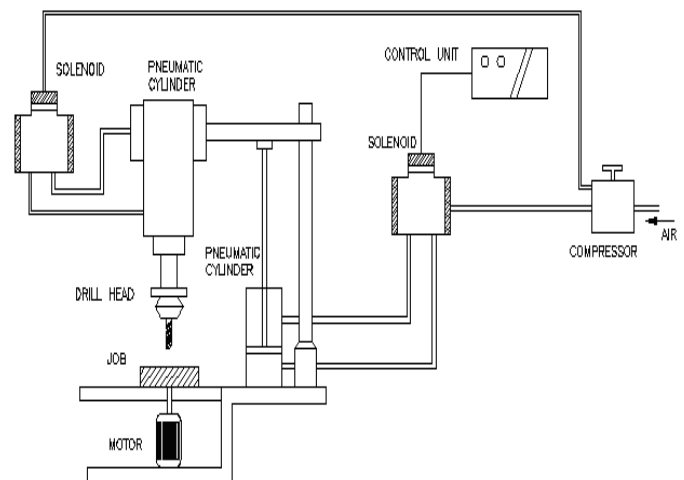


Fig -1: Block diagram

5. WORKING PRINCIPLE

The compressed air from the compressor is used as the force medium for this operation. The pneumatic double acting cylinder used.

The air from the compressor enters to the four way junction. From four way junctions one way of air enters to the barrel unit. In-side the Barrel having vane arrangement is welled. The other way of air enters to the solenoid valve.

The function of solenoid valves all of air correct time interval. From solenoid valve air enters to the pneumatic double acting cylinder through flow control valve.

The solenoid valve on condition, the drilling head is automatically downwards and drilling operations occurs. After some time, the solenoid valve is off: the drilling head is automatically released.

6. STEPS INVOLVED

- Piping
- Fitting
- Controls

6.1 Piping

Piping is nothing but the supply taken from the compressor to the pneumatic multipurpose machine area, then the supply will be splitted into two different pressure namely Working pressure and operating pressure.

Working pressure is the pressure which makes the vane to rotate which will be a high pressure supply, was as the Operating pressure is simply the pressure which is used to move the vane setup up and down.

6.2 Fitting

Fitting is just to connect the actuators and the supply line through the control valves, were direction control valve and solenoid valves will be under this category.

6.3 Controls

It plays a vital role in total operation were as the control consists of pressure controls and the electric controls Pressure control system controls the speed of the vane which indirectly desires the rate of feed and electric controls the solenoid valve with the perpendicular moment of the vane movement

7. APPLICATION

This concept can be easily applied in all manufacturing areas were as it occupies less space and it operates through pneumatic power so it doesn't required any additional electrical supply.

By applying such concepts could perform many more operations in the industry which makes the power consumption lower

8. CONCLUSION

This process will be a beneficiary one for the entire industry because it uses the excess pressurized air which is sent out from the compressor.

REFERENCES

- [1] P.M. Pradhan, "Experimental Investigation and Fabrication of Pneumatic Punch", International Journal of Innovative Research in Science, Engineering and Technology, Vol.2, Issue 6, June 2013.
- [2] . U.P. Singh, "Design Study of the Geometry of a punching tool", Journal of Material Processing technology, 33(1992) 331-345 Elseiver.
- [3] A.S. Aditya Polapragada & K. Sri Varsha, "Pneumatic auto feed punching machine", International Journal of Engineering Research and Technology, (IJERT) Vol.1 Issue7, September-2012, ISSN:2278-0181.
- [4] ZhuZhenghea,GongHua,LuZhenfeng,bYongHuashan,bLiuLeic,HeWeic, "Flexiblepunchingsystem using industrial robots for automotive panels", Robotics and Computer-Integrated Manufacturing, Volume 52, August 2018, Pages 92-99
- [5] James,Lowrie,Gracious,Ngai, "New punch design for the elimination of punch ejection load through manipulation of the elastic strain field in the punch nose", Journal of Manufacturing Processes Volume 22, April 2016, Pages 49-59
- [6] S. Madhankumar, M. Jishnu, J. Karthick Prithiv, S. Gowrishankar, S. Rajesh R. Balamurugan, "Design and Modelling of Disaster Relief Vehicle using Rocker Bogie Mechanism", International Journal of Innovative Technology and Exploring Engineering, Volume-8 Issue-6, April 2019, Pages 1274-1276.
- [7] T. A. Selvan, A. Viswanathan, S. Madhankumar and S. Sneha, "Design and Fabrication of Automated Powder Coating System", International Journal of Engineering and Advanced Technology, Volume-8 Issue-5, June 2019, Pages 899-902.

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