

PLC Based Automated Drilling Machine

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ABSTRACT

Today most of the industries are trying to make improvement in their production processes as well as relevant machinery to improve the productivity along with the automation. Drilling, tapping, boring etc. are such operations which are most frequently used in small and large scale industries. Most of the industries uses the conventional method says hand tapping drilling, boring. This conventional method is very time consuming process, less accurate and includes higher labour cost, and ultimately leads to less productivity. So there is a scope to develop the machine for various operation which would overcome all the problems faced by the conventional process. So we are going to develop the portable pneumatics machine which will make the use of compressed air for it operation less human involvement as which is used in hand tapping, drilling, boring.

I. INTRODUCTION

The main objective of our project is to perform various machine operations using in multi spindle drilling machine with the help of motor sources. For a developing industry the operation performed and the parts (or) components produced should have it minimum possible production cost, and then only industry runs profitability. In small-scale industry and automobile maintenance shops, there are frequent needs of tightening and lessening of screws; drilling, boring, grinding. Further for every operation separate machine is required. This increases the initial cost required, large area requirements and large number of

machine is required. In our project above complicated are rectified. A method of controlling a gear change of an automobile, said automobile comprising an internal combustion engine; an automatic transmission connected to an output rotation shaft of said engine so as to transmit the rotational output of said engine to drive wheels of said automobile through any selected one of a plurality of gear ratios; a load device selectively connectable to said output rotation shaft of said engine via selectively-connecting means; and means for generating a gear change control signal for selecting one of said gear ratios of said automatic transmission in accordance with one of operational conditions of said automobile

and said engine said method comprising the steps of controlling said selectively- connecting means when said gear change signal-generating means generates the control signal for shifting up the gear in said automatic transmission, in such a manner that said selectively-connecting means connects said load device to said output rotation shaft of said engine.

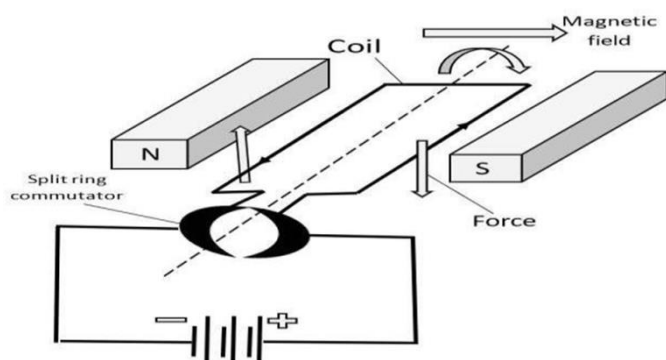
II. COMPONENTS AND DESCRIPTION

The following components are used in this project

- DC MOTOR
- DRILL BIT
- FRAME
- PNEUMATIC CYLINDER
- BATTERY
- SOLINOID VALVE
- CONTROL CIRCUIT

An electric motor is a machine which converts electrical energy to mechanical energy. Its action is based on the principle that when a current- carrying conductor is placed in a magnetic field, it experiences a magnetic force whose direction is given by Fleming’s left hand rule.

DC MOTOR



When a motor is in operation, it develops torque. This torque can produce mechanical rotation. DC motors are also like generators classified into shunt wound or series wound or compound wound motors.

PNEUMATIC CONTROL COMPONENT

PNEUMATIC CYLINDER:-

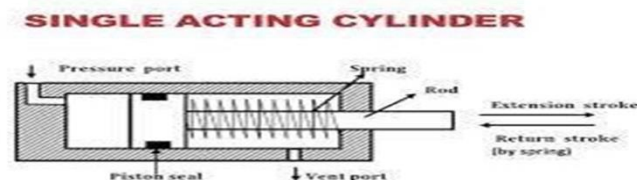
An air cylinder is an operative device in which the state input energy of compressed air i.e. pneumatic

power is converted in to mechanical output power, by reducing the pressure of the air to that of the atmosphere.

SINGLE ACTING CYLINDER:

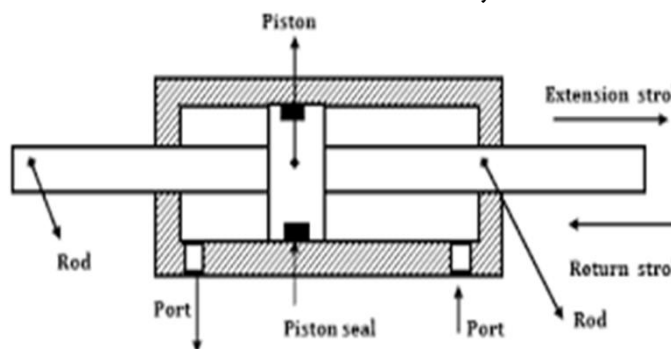
Single acting cylinder is only capable of performing an operating medium in only one direction. Single acting cylinders equipped with one inlet for the operating air pressure, can be production in several fundamentally different designs.

Single cylinders develop power in one direction only. Therefore no heavy control equipment should be attached to them, which requires to be moved on the piston return stoke single action cylinder requires only about half the air volume consumed by a double acting for one operating cycle.

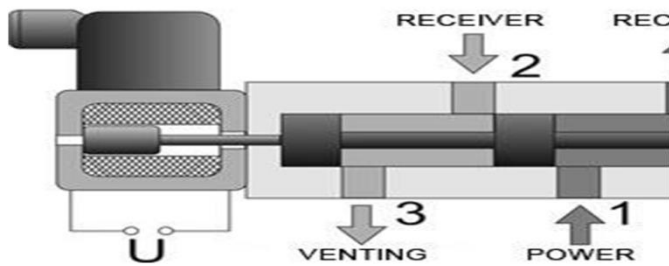


DOUBLE ACTING CYLINDER:

A double acting cylinder is employed in control systems with the full pneumatic cushioning and it is essential when the cylinder itself is required to retard heavy messes. This can only be done at the end positions of the piston stock. In all intermediate position a separate externally mounted cushioning derive most be provided with the damping feature. The normal escape of air is out off by a cushioning piston before the end of the stock is required. As a result the sit in the cushioning chamber is again compressed since it cannot escape but slowly according to the setting made on reverses. The air freely enters the cylinder and the piston stokes in the other direction at full force and velocity.



SOLENOID VALVE:-



The directional valve is one of the important parts of a pneumatic system.

Commonly known as DCV, this valve is used to control the direction of air flow in the pneumatic system. The directional valve does this by changing the position of its internal movable parts.

This valve was selected for speedy operation and to reduce the manual effort and also for the modification of the machine into automatic machine by means of using a solenoid valve.

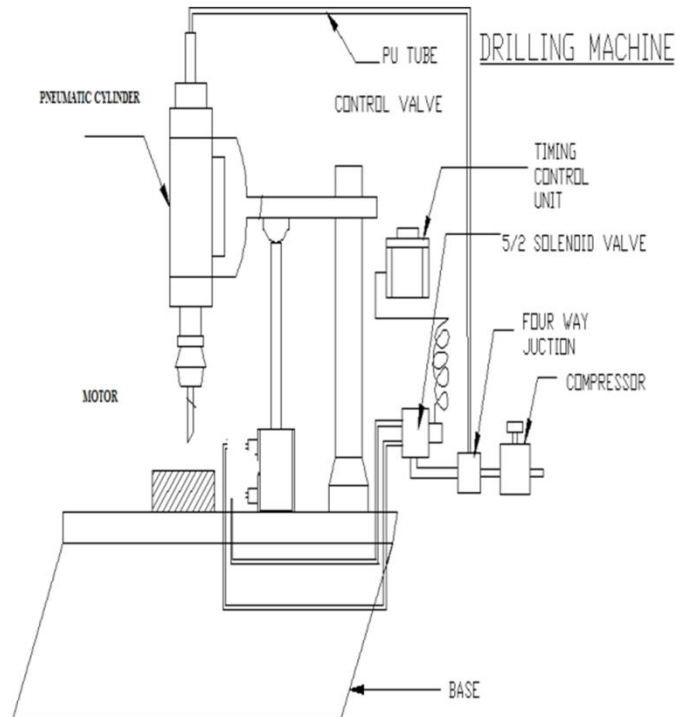
A solenoid is an electrical device that converts electrical energy into straight line motion and force. These are also used to operate a mechanical operation which in turn operates the valve mechanism. Solenoids may be push type or pull type.

III. WORKING PRINCIPLE

Here we are using the motor to drilling operation, and the speed of the motor is controlled by the setting of key which is controlled in the control unit. Control unit it is noting but the small chip called microcontroller its already programmed and feed in the chip for working of our project. Here the drill bits are fitted in the motor shaft which is clearly shown as in the below diagram To avoid the frictional moment here we have added the Pneumatic arrangements at top of the spindle. By using the handle through the top of the pneumatic arrangement we are fixing the motor with the help of holding clamber with moves up and down movement for the purpose of drilling

the work piece. And in this machine we can change the drill tools for working of different operation like the tapping, screw driver etc..,

2D DRAWING



ADVANTAGES

- Quick operation
- Accuracy is more
- Low cost machine
- Its used multipurpose device like Grinding, screw driving
- User friendly machine
- Skilled labour's not required

LIST OF MATERIALS

- MOTOR
- TUBE WITH CONECTOR
- FRAME
- DRILL TIG
- BATTERY
- PNEUMATIC CYLINDER
- CONTROLL UINT

IV. APPLIACATION

Proper application of a PLC begins with an economical justification analysis. The batch process in chemical, cement, food and paper industries are sequential in nature, requiring time or event based decisions. PLCs are being used more and more as total solutions to a batch problem in these industries rather than just a tool. In batch process savings are developed principally from reduced cycle time and scheduling. Cycle automation provides rigid control enforcement to eliminate human errors and to minimize manual interventions

V. CONCLUSION

This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding, planning, purchasing, assembling and machining while doing this project work. We feel that the project work is a good solution to bridge the gates between the institution and the industries. In conclusion remarks of our project work, let us add a few more lines about our impression project work. Thus we have developed a "PLC based Automatic Drilling Machine " which helps to design a robot. In this project, we have combined the mechanisms of robotic and monitoring systems using an electronic control units which actually moves and records the instants of the soil report and feeds it back to the control unit.

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