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Fabrication of 360 degree flexible drilling machine

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ABSTRACT

This project present the Directional drilling machine which can be used based on drilling holes in various location and movement and easily operation done with high accuracy. Productivity can be improved by reducing total machining time and reduced human effort and reduced manufacturing cycle time. Which deals with miniature trends. Drilling process is one of the machining processes which is used to drill micro holes not only in micro products but also in relatively larger work pieces which require ultra-small features which can be accomplished only by drilling process location and movement and easily operation done with high accuracy Productivity can be improved by reducing total machine time and reduced human effort and reduced manufacturing process cycle time Drilling, taping, boring. 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.

INTRODUCTION

Drilling hole in parts, sheets and structures is a regular industrial work. Perfect and well aligned drilling needs fixed and strong drills. So here we propose a 360 degree flexible drill that can be mounted on a table or wall and can be used to drill holes horizontally, vertically or even upside down. Drill machines have been the heart of every industry. Drilling may affect the mechanical properties of the work piece by creating low residual stresses around the hole opening and a very thin layer of highly stressed and disturbed material on the newly formed surface. 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 [1].

LITERATURE SURVEY

1. Mr. K. I. Nargatti, Mr. S. V. Patil , Mr. G. N. Rakate (2016) developed a model in Multispindle Drilling Head with Varying Centre Distance. Multiple-spindle drilling machines are used for mass production, a great time saver where many pieces of jobs having many holes are to be drilled.
2. Anup R.Chaple- 2016, 5-axis machine with Computer aided design (CAD) software systems give us the potential to model very complex shapes.
3. Yogendra Tyagi, Vadansh Chaturvediand JyotiVimalhave conducted an experimenton drilling of mild steel, and applied the taguchi methods for determining the optimum parameters condition for the machining process using the taguchi methods and analysis of variance

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4. Mr. Sakate P.R, Mr. Jadhav A.S. Prof. Bamankar P.B.Miss. Jagadale A.A. Miss. Bhosale P.S. Multiple-spindle drilling machines are used for mass production as it save large time where many pieces of jobs having many holes are to be drilled.
5. Prof. Gadhia Utsav .D , Shah Harsh A, Patel Viral A, Patel Kushang P, Amin Harsh J. Due to the various problems faced by conventional operation processes such as Poor thread finish, more time consumption, frequent tool breakage and many more.
6. Mr. Jay M. Patel , Shree once the work piece is clamped, there is no need for re-clamping in a different direction, reduces the number of machines needed, elimination of human error.
7. R.Anandhan, P.Gunasekaran, D.Sreenevasan, D.Rajamaruthu, As the name indicates multiple spindle drilling machines have two spindles driven by a single power head, and these two spindles holding the drill bits are fed into the work piece simultaneously

METHODOLOGY

Problem Identification
↓
Literature review
↓
Making model and testing
↓
Fabrication of drilling
↓
Result and discussion
↓
Documentation and Result

COMPRESSOR

Compressor is the air producing machine. The air was taken through the atmosphere during the machine is running. Air compressors are used to raise the pressure of a volume of air. Air compressors are available in so many configurations and will operate over a very wide range of flow rates and pressures [2-5].

PNEUMATIC CYLINDER

An air cylinder is an operative device in which the state input energy of compressed air in pneumatic power is converted into mechanical Output power, by reducing the pressure of the air to that atmosphere. 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 be done only at the end positions of the piston stroke. In all intermediate position a separate externally mounted a derive most be provided with the damping feature [6].

Fig. 1 Double acting cylinder

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 air flow direction in the pneumatic system. The directional valve done this by the position changing of its internal movable parts [7].

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.

Fig. 2 Solenoid valve

PORTABLE DRILLING MACHINE

This types of drilling machines commonly used in all the workshop. Used to drill small sized holes. It is operated by holding in a hand. The work piece where the hole is to be drilled is held in a vice.

TWIST DRILL BIT

This is a most common type of drill used today is the twist drill. It was originally manufactured by twisting a flat piece of tool steel longitudinally for several revolutions, then grinding the diameter and the point. The present-day twist drills are made by machining two spiral flutes or grooves that run lengthwise around the body of the drill. The twist drill is an end cutting tool. Different types of twist drills are classified by Indian standard Institution according to the type of the shank, length of the flute and overall length of the drill [8]

.

Fig. 3 Twist

PNEUMATIC DRILL MACHINE

Mechanization is broadly defined as the replacement of manual effort by mechanical power. Pneumatic is an attractive medium for low Cost mechanization particularly for sequential (or) repetitive operations. Many factories and plants already have a compressed air system, which is capable of providing the power (or) energy requirements and control system (although equally pneumatic control systems may be economic and can be advantageously applied to other forms of power).The main advantage of an all pneumatic system is usually Economic and simplicity the latter reducing maintenance to a low level. it can have outstanding advantages in terms of safety. Pneumatic systems use pressurized gases to transmit and control power. Pneumatic systems typically use air as the fluid medium because air is safe, low cost and readily available.

CONTROL UNIT

In pneumatic multipurpose device is an air-operated device used for many small operations. It is a portable one. Compressed air is the source of energy for this device. The compressed air is allowed through the nozzle in such a way to rotate to fan> the rotation is utilized for machining. The nozzle are welded the fan can be rotated in either directions by operating by one-way works. The rpm, and torque of the shaft depends upon the pressure of the air admitted so by varying the pressured the RPM and torque can be varied. Thick tubes interconnect the parts. The clamps are used at the connecting parts to prevent leakage. In thread parts seals are used to prevent leakage. Here the compressed air form the compressor firstly enters the Control unit. In the control unit the pressure of the air is controlled unit the pressure of the air is controlled and sent to the barrel to rotate the fan in any one direction. The gate valve controls the pressure volume of air. Then the pressure is read by a pressure gauge. Then the air is admitted to the barrel, a shaft is placed and if carries the fan. The shaft is supported in either and by bearing. The bearings are placed in the Couplings, which covers the end of barrel.

FRAME

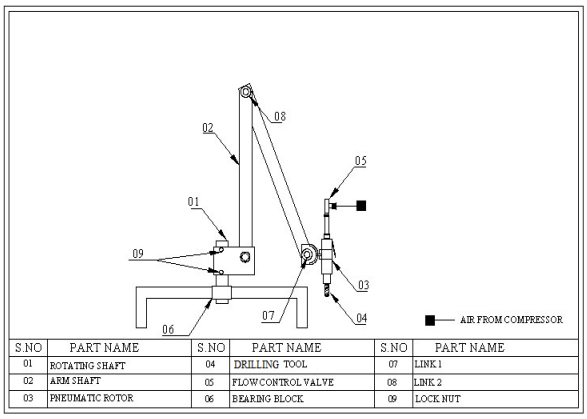
The solenoid frame serves several purposes. Since it is made of laminated sheets, it is magnetized when the current passes through the coil. The magnetized coils attract the metal plunger to move. The frame has provisions for attaching the mounting. They are usually bolted or welded to the frame. The frame has provisions for receivers, the plunger. The wear strips are mounted to the solenoid frame, and are made of materials such as metal or impregnated less Fibre cloth.

PROBLEM IDENTIFICATION

1. At present in drilling machine there is no 360 angle of rotation of the arm
2. Hence the problem is resolved by using a bearing attachment of the arm

WORKING PRINCIPLE

The cylindrical drilling machine device is an air operated device used for many small operations. It is a portable one. Compressed air is the source of Energy for this device. The compressed air is allowed through the nozzle in such a way to rotate the fan. The rotation obtained is utilized for machining. The nozzles are welded to the barrel at an angle to facilitate free rotation. The rpm and Torque of the shaft depends upon the pressure of the air admitted so by varying the pressure the rpm and torque can be varied. The parts are interred connected by thick tubes. Clamps are used at the connecting parts to prevent leakage. In threaded parts thread seals are used to prevent leakage. Here the compressed air from the compressor firstly enters the control unit. In the control unit the pressure of the air is controlled and sent to the barrel to rotate the fan in any one direction. Drill is a machine tool used for drilling the holes in solid materials like metal and wood with drill bit or driver bit.



S.NO	PART NAME	S.NO	PART NAME	S.NO	PART NAME
01	ROTATING SHAFT	04	DRILLING TOOL	07	LINK 1
02	ARM SHAFT	05	FLOW CONTROL VALVE	08	LINK 2
03	PNEUMATIC ROTOR	06	BEARING BLOCK	09	LOCK NUT

Fig. 4 360 Degree Flexible Drilling Machine

ADVANTAGES

1. Automobile workshops
2. Small Scale industries
3. In such places where frequent changes in drilling operations are required
4. For performance operations in huge parts which cannot be done in ordinary machines, since it is portable.

CONCLUSION

The project carried out by us made an impressing task in the field of automobile manufacturing industries. It is very useful for the workers work in the lath and small scale industries. This project will reduce the cost involved in the concern. Project has been designed to perform the entire requirement task at the shortest time available.

FUTURE SCOPE

1. It is used in industries
2. It is used with automation for automatic drilling
3. In future it is used in every field where drilling is required
4. This method f rotation of arm in other machining operation

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