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THE PNEUMATIC OPERATED SHEET METAL SHEARING MACHINE

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ABSTRACT

The tire was first documented by the hero of Alexandria in 60 AD, but this concept already existed. Today, pneumatic products represent a multibillion-dollar industry. Pneumatic tools are used in many industrial applications. Pneumatic devices are generally suitable for applications requiring less power than hydraulic applications and are usually cheaper than electrical applications. Most pneumatic equipment is designed to use clean dry air as a source of energy. The drive then converts the compressed air into mechanical operation. The type of movement performed depends on the drive design. The tire is used in various settings [2]
Keyword:-Pneumatic, SPM, etc.

1. INTRODUCTION

In dental applications, pneumatic drills are lighter, faster and simpler than an electric drill with the same power rating (because the primary nozzle, compressor, brush separator and air pump can rotate the drill at extremely high speeds). Pneumatic transmission systems are used in many industries to move powders and pellets. Pneumatic tubes can carry objects far and wide. Pneumatic equipment is also used where, for safety reasons, electric motors cannot be used, such as mining applications where drills are driven by air motors, in order to reduce the need for a deelectric motor in the deep part of the mine where there are explosive gases.

Pneumatic cylinders are usually cheaper than hydraulic or electric cylinders of the same size and capacity. Razor types
Shavers are classified as follows: -

1) Pneumatic operation
2) Hydraulically operated
3) Use of comb and pinion
4) The spring moves
A brief description of all types is as follows. 1) Pneumatic operation: -

Here, the pick-up is moved up and down by means of a pneumatic double-acting arrangement of the piston and cylinder units with a foot-operated directional valve. In this type of machine, high-pressure air is used as the working fluid for energy transfer and operation.

2) Hydraulic drive: -
Here, the lowering and raising of the head is performed by means of a hydraulic arrangement of the piston and the cylinder. To move the piston and cylinder, oil is allowed to enter the cylinder from the front or rear of the piston. However, oil is quite expensive and its leakage can cause many problems.

3) The comb and pinion serve: -
Here, the lowering and lifting of the head is done manually using a ridge arrangement. In this case, the required pressure is exerted manually by the direct manual pressure of the comb with the pinion and lever arrangement. Because the machine is strong and requires a lot of pressure, it is not suitable.

4) Spring driven: -
The operation of a spring-driven machine is similar to that of a comb and pinion machine, but differs in design. Here, the lowering and lifting of the heating handle is done manually and requires too much pressure for its operation, and there is also the possibility of damage to the workpiece due to careless handling [1].

1.1 pneumatic cylinder
Pneumatic cylinders as well as air cylinders are mechanical devices used to supply a liquid, usually compressed air.

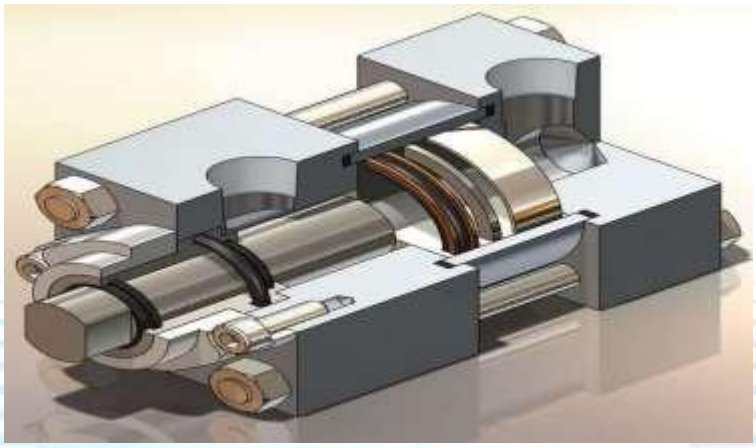

Figure 1. Pneumatic Cylinder [1]

A typical pneumatic cylinder consists of a piston, piston rod, and a body or tube. Compressed air enters at one endof the tube, imparting force on the piston, which is then displaced (moves) in order to balance the force exerted on the piston. Air cylinders, or actuators as they are also called, are available in a variety of sizes, shapes, and have varying strokes. Typical cylinder sizes range from a small 2.5mm air cylinder, which might be used for picking up a small transitory or other electronic

2. PROBLEM DEFINATION

In this work, we plan to produce SPM (Special Purpose Machine) for sheet metal cutting operations. Conventional hydraulic machines, which are the most expensive and largest, are usually used in the industry for the same operation. Sheets in are used
1. Car body
2. Airplane wings
3. Medical tables
4. Roofs of buildings (Architectural) and other objects
5. Steel sheets and other materials with high magnetic permeability, also known as laminated steel cores, have applications in transformers and electrical machines.

Historically, the main use of sheet metal was in the sheet metal armor worn by the cavalry, and the sheet metal still has many decorative uses, including horsehair, here we plan to use a double-acting cylinder for operation. . [4] We do the design calculation, then we go to design and experimentation.
Here we use a double-acting cylinder. It is a pneumatic drive that is controlled by compressed air. The force acting on the compressed air moves the piston in both directions in a double-acting cylinder. The stroke length is basically unlimited, although struts and bends must be considered before selecting a particular piston diameter, rod length and length. [1-2] The double-acting cylinder consists of
1) Cylinder tube
2) Piston unit
3) Double wrapping of the piston cup, wrapping of the rod with an O-ring
4) Bronze rod guide
5) Piston rods
6) End caps (flanges)
7) Port connection
8) Assembling the pillow.

3. PROPOSED WORK

To make each part of the machine, the type of material must be carefully selected with regard to construction, safety and the following points: - The choice of material for the technical application is determined by the following factors: - [4]
1) Availability of materials.
2) Suitability of material for required components.
3) Suitability of the material for the required working conditions.
4) Material costs.
In addition to the above, other properties to consider when choosing a material are the following: -
1) Availability of materials. 2) Suitability of material for required components.
3) Suitability of the material for the required working conditions.
4) Material costs.
In addition to the items listed above, other properties to consider when selecting a material are the following: - Physical properties: -
These properties are color, shape, density, thermal conductivity, electrical conductivity, melting point and so on. Mechanical properties: -
The properties are related to the ability of the material to withstand mechanical forces and loads. The various features are: -
i) Strength: This is a property of the material with which it can withstand external forces without breaking or giving up.
ii) Hardness: This is the ability of the material to withstand deformation under stress.
iii) Elongation: - This is a property of the material that can be attached to the wires under tensile loading.
iv) Measurability: It is a property of the material that rolls into sheets.
v) Hardness: This is the property of a material to withstand wear, changes and the ability to cut another material. vi) Strength: This is the ability of the material to maintain strength and withstand impact and impact loads.
vii) Deformation: This is a slow and permanent deformation caused by a part exposed to constant stress at high temperature. We select the material taking into account the above factors and also the availability of the material.
Below is the methodology we use for our Phase II SPM production project for a pneumatically operated sheet metal cutting machine.
1. The cylinder will be made of an aluminum solid bar with a lathe center bore. It is then smoothed from the inside by grinding and patching. If it consists of a piston and a piston rod that responds to and back using high pressure air. The piston is equipped with a piston ring made of Teflon rubber for perfect air compression. 5/2 directional foot control valve. [5]

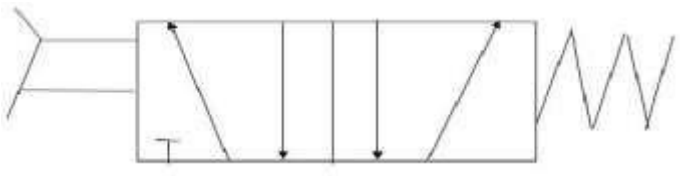

Fig. 2 5/2 control valve [1]

1. To generate the hydraulic circuit diagram for the above operations.

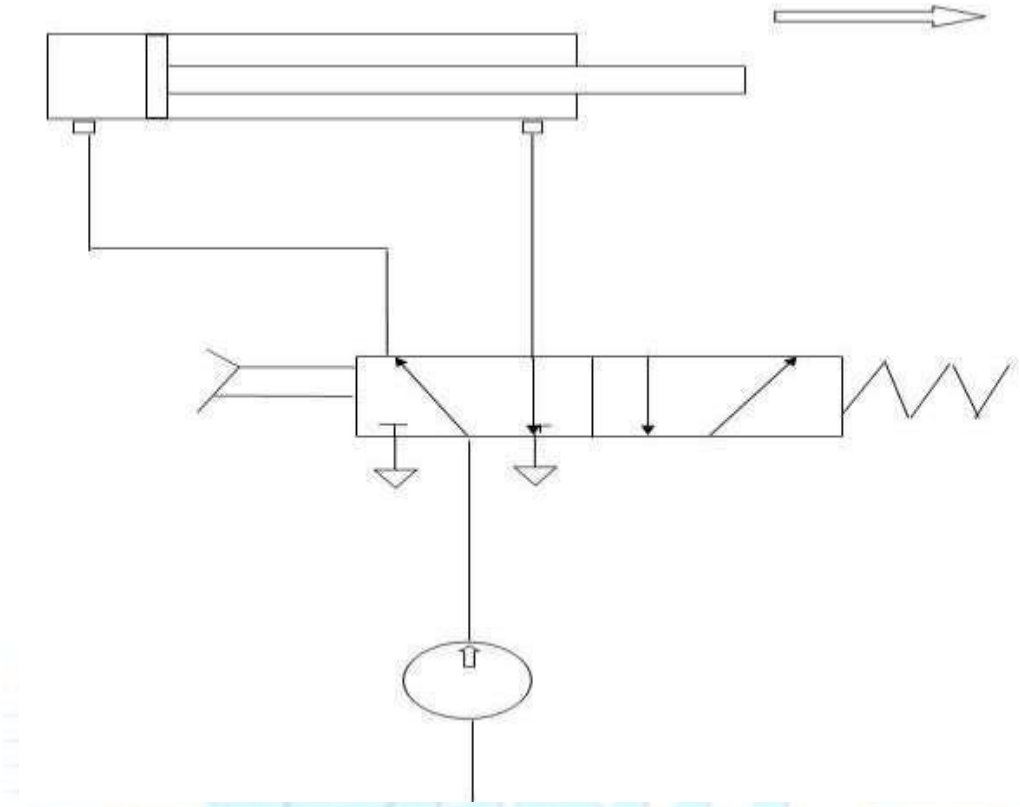

Fig. 3 Hydraulic circuit diagram for neutral position [1]

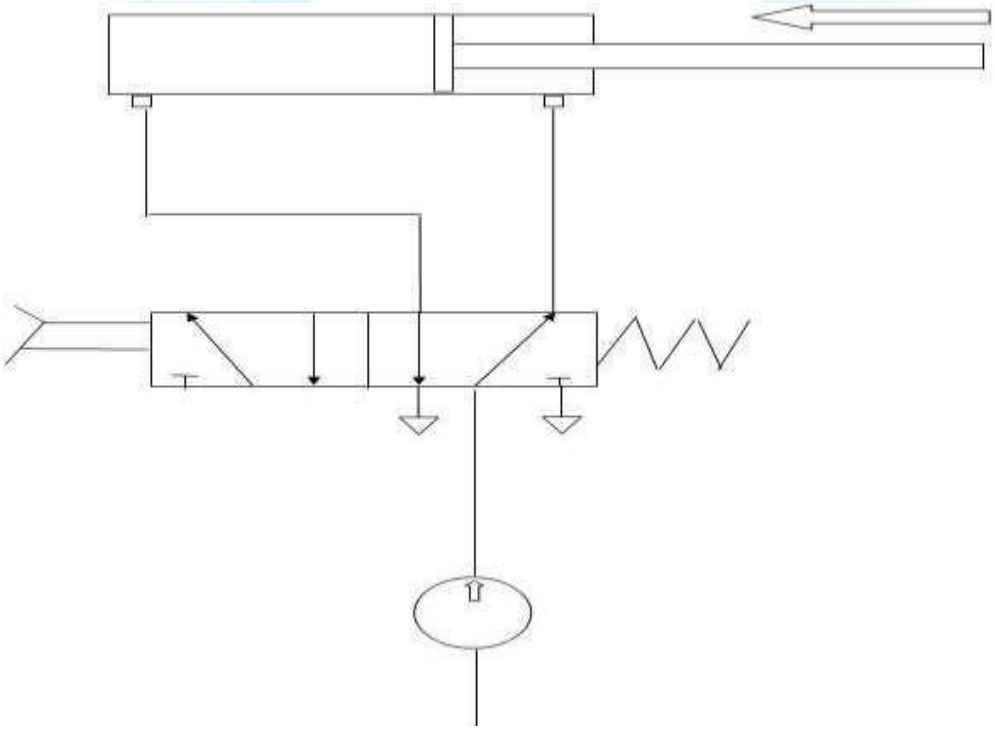

Fig. 4 Hydraulic circuit diagram for working condition [1]

2. In stage II we will plan to do design calculation followed by manufacturing and experimentationFollowing path is followed for the proceeding project work for project stage II

Table 2 Proposed work for project stage II

Sr. No.	Month	Task to be done
1	November 2019	Review research paper proceeding and paper publication on project stage I
2	December 2019	Design calculation of different part of SPM.
3	January 2020	FEA analysis and simulation with the design calculation,
4	February 2020	Manufacturing of SPM and experimental calculations.
5	March 2020	Report writing with guidance from project guide
6	April 2020	Report writing with guidance from project guide and final presentation preparation and publishing research paper 2 on Project Stage II.

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3. Machine tool design handbook.
4. P.S.G. Design Data Book