

Fabrication of Pneumatic Hacksaw

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Abstract- The goal of this work is to computerize the regular power hacksaw machine so as to accomplish high profitability of work pieces than the power hacksaw machine utilizing pneumatic power. Pneumatic is a tremendous theme of science and designing managing the mechanical properties of air. In our undertaking we take this pneumatic and a hacksaw for cutting reason, The pneumatic responding fast hacksaw machine has favorable position of working in high weight, the hacksaw utilized as a part of this is respond to such an extent that required shape can be cutted as indicated by the prerequisite. The hacksaw is the metal slicing machine device intended to cut metal by applying pneumatic weight. Hacksaws are utilized to cut thin and delicate metals the operation of the unit is streamlined to a couple of basic operations including a barrel piece and cylinder game plan. There are various frameworks in hacksaw machine.

Index Terms- Hacksaw Machine

1. INTRODUCTION

The hacksaw is the metal cutting machine apparatus planned to cut metal by applying pneumatic weight. The machine only expected for large scale manufacturing and they speak to affix and more proficient approach to cut a metal. Hacksaws are utilized to cut thin and delicate metals the operation of the unit is disentangled to a couple of basic operations including a chamber square and cylinder course of action. There are various frameworks in hacksaw machine. The principle capacity of pneumatic hacksaw is to cut thin and delicate metals by pneumatic power.

2. LITERATURE REVIEW

PNEUMATICS:

The word 'pneuma' originates from Greek and means wind. The word pneumatics is the investigation of air development and its wonders is gotten from the word

pneuma. Today pneumatics is for the most part comprehended to implies the utilizations of air as a working medium in industry particularly the driving and controlling of machines and gear.

Pneumatics has for some impressive time between utilized for completing the easiest mechanical assignments in later time has assumed a more essential part in the improvement of pneumatics innovation of robotization.

Pneumatic frameworks work on a supply of packed air which must be made accessible in adequate amount and at a strain to suit the limit of the framework. At the point when the pneumatic framework is being received out of the blue, in any case it will undoubtedly the important to manage the inquiries of compacted air supply.

The key parts of any office for supply of compacted air are by implies utilizing responding compressor. A compressor is a machine that takes in air, gas at an abridges weight and conveyed the air at a high weight. Compressor limit is the real amount of air compacted and conveyed and the volume communicated is that of the air at consumption conditions to be specific at climate weight and ordinary encompassing temperature.

The compressibility of the air was first explored by Robot Boyle in 1662 and that found that the result of weight and volumes of specific amount of gas. The standard composed as $PV=C$ (or) $P_1V_1 = P_2V_2$.

In this condition the weight is the supreme forced which for nothing is around 14.7 Psi and is of mettle of keeping up a segment of mercury, almost 30 inches high in a standard gauge. Any gas can be utilized as a part of pneumatics frameworks yet air is the generally utilized frameworks now a days.

Choice of Pneumatics:

Automation is extensively characterized as the substitution of manual exertion by mechanical power. Pneumatic is an appealing medium for minimal effort

motorization especially for consecutive (or) reparative operations. Numerous manufacturing plants and plants as of now have a packed air framework, which is equipped for giving the power (or) vitality necessities and control frameworks (albeit similarly pneumatic control frameworks might be financial and can be beneficially connected to different types of energy).

The fundamental focal points of an all pneumatics frameworks are generally Economic and straightforwardness the last decreasing support to a low level. It can have exceptional focal points in term of security.

Sorts:

Albeit pneumatic barrels will differ in appearance, size and capacity, they for the most part can be categorized as one of the particular classifications demonstrated as follows. However there are likewise various different sorts of pneumatic chamber accessible, a considerable lot of which are intended to satisfy particular and specific capacities.

Single Acting Cylinders:

Single acting chambers (SAC) utilize the power conferred via air to move one way (normally out), and a spring to come back to the "home" position

Twofold Acting Cylinders:

Twofold Acting Cylinders (DAC) utilize the power of air to move in both broadens and withdraw stories. They have two ports to permit air in, one for outstroke and one for in stroke.

Different Types:

In spite of the fact that SACs and DACs are the most widely recognized sorts of pneumatic chamber the accompanying kinds are not particulars uncommon:

- Rotary air chambers: actuators that utilization air to confer a revolving movement.
- Rod less air chambers: actuators that utilization a mechanical or attractive coupling to confer drive, commonly to a table or other body that moves along the length of the barrel body, yet does not reach out past it.

SIZES:

Air barrels are accessible in an assortment of sizes and can commonly go from a little 2.5mm air

chamber, which may be utilized for grabbing a little transistor or other electronic segment, to 400mm distance across air chambers which would bestow enough power to lift an auto. Some pneumatics barrels achieve 1000mm in breadth and are utilized as a part of place of water driven chambers for exceptional conditions where releasing pressure driven oil could force an outrageous peril.

WEIGHT, RADIUS, AREA AND FORCE RELATIONSHIPS:

Despite the fact that the distance across of the cylinder and the power applied by a chamber are connected, they are not specifically corresponding to each other. Moreover, the regular scientific connection between the two expect that the air supply does not wind up plainly soaked. Because of the viable cross sectional zone lessened by the region of the cylinder pole, the in stroke constrain is not as much as the outstroke drive when both are fueled pneumatically and by same supply of packed gas.

PNEUMATICS POWER:

Pneumatic frameworks utilize pressurized gases to transmit and control. Pneumatic frameworks regularly utilize air as the liquid medium since air is sheltered, minimal effort and promptly accessible.

The equation portraying this activity is:

Power = Pressure * Area

Power is corresponding to weight and region. At the point when a chamber is utilized to brace or Press, its yield power can be figured as takes after: $F = P * A$

P = weight (PSI (Bar) (Pascal's))

F = drive (pounds Newton's))

A = zone (square inches (square meters))

These weight, power and zone connections are some of the time delineated as appeared underneath to help in recollecting the conditions.

Directional Control Valves:

To alter the course of wind stream to and from the barrel, we utilize a directional control valve. The moving part in a directional control valve will

3. PORTRAYAL OF EQUIPMENTS

3.1 COMPRESSOR:

Compressor is the air creating machine. They gather the pretense shape the climate are in the running of

machine are motor. Air compressors are used to raise the weight of a volume of air. Air compressors are accessible in numerous arrangements and will work over an extensive variety of stream rates and weights. Compacted air was removed by crude man to give sparkling ashes adequate oxygen to enable them to erupt into a fire. Amid the pressure procedure, the temperature increments as the weight increments. This is known as polytypic pressure. The measure of pressure control additionally increments as the temperature increments. Compressors are arranged consequently lessening the temperature rise and enhancing the pressure proficiency. They temperature of the air leaving each stage is cooled before entering the following stage. This cooling procedure is called bury cooling. Volumetric proficiency likewise increments with multi-arrange pressure since the weight apportion over the primary stage will be diminished.

Determination of the air compressor is just the initial phase in planning a productivity and dependable compacted air framework. The air existing the compressor is immersed with dampness and will have compressor ointments (greased up compressors as it were). Different chemicals that may have been drawn into the compressor admission may likewise be available. This pollution is unsafe to may process, pneumatic apparatuses, instruments and gear. Air sanitization gear, channels, hair dryers, breathing air purifiers, checking hardware, sued alone or in blend will expel these contaminants. Choice and buy of the compressor and fundamental purging hardware can be effortlessly done on the compacted air site. Our application engineers are prepared to answer the greater part of your inquiries and help you in putting in your request. Furthermore, it work during the time spent turning the fan and the cylinder development with the assistance of current supply.

3.2 PNEUMATIC CYLINDER:

Pneumatic barrels give a power by changing over the potential vitality of packed gas into dynamic vitality. This is accomplished by the compacted gas having the capacity to extend, without outer vitality input, which itself happens because of the weight his air extension powers a cylinder to move the coveted way.

Chambers additionally exist which must be moved pneumatically one way. The arrival development is

caused by a spring. Chambers of this write are called "single-activity barrels". The compressor barrel is a solitary activity chamber.

Keeping in mind the end goal to move a barrel is the two headings, two of the qualities contained in the unit and required.

To move the barrel outwards, valve V1 must be open (the loop is provided with electric current) and esteem V2 shut (no present streaming)

To move the chamber inwards, valve V2 is open and valve V1 shut. The chart additionally influences it to clear why vent "R" on the valve is required. Without this vent, the chamber would be not able move as a similar weight would be applied on the two sides of the cylinder and the air would not have the capacity to get away. The pneumatic frameworks utilizes physically or electrically worked valves to control bearing of development. Directional control valves can be worked by the hand lever or electric solenoid to keep up a movable travel rate. The interior porting or spool of the bearing control valves directs wind stream.

To broaden the chamber cylinder, wind currents into the directional valve weight port, through the stream control valve, and into the barrel. As weight works in a single end of the barrel and the bar begins to broaden, air debilitates out the contrary end of the chamber. The stream control valve on the finish of the chamber limits leaving wind current, which assembles strain to moderate pole development.

The debilitating air goes through the stream control valve and the directional control valve situated toward the finish of the barrel and depletes to the environment. At the point when the chamber withdraws, the stream control valve toward the finish of the barrel controls at individual, and the principal valve permits air feely through.

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A few chambers have a pad on one or the two finishes of movement. This pad is a stream control valve the does not work until the point that the barrel cylinder achieves a specific point in the chamber. At that point, the pad confines wind stream to moderate

the chamber development. This enables it to move to the finish of its movement at a slower speed. This change is ordinarily on the finish of the barrel head. See the air channeling schematic to perceive what particular controls are furnished with this gear. Since pneumatics frameworks dependably contain dampness from the air, the framework ought not be permitted to solidify. Solidifying can harm the seals and control surfaces, permitting air spillages past valves, or locking a valve from working. Check valves might be embedded in the line to make sure the chamber will remain in the coveted position and not float. This is helpful on the off chance that some part is spilling, or there is lost gaseous tension in the plant framework.

REQUIREMENTS FOR PNEUMATIC POWER:

Pneumatic framework utilize pressurized gases to travel and control as the name suggests pneumatic frameworks regularly utilize air a liquid medium since air is a protected, ease and promptly accessible liquid. It is especially sheltered conditions where an electrical start could touch off breaks from the framework segments.

There are served explanations behind considering the utilization of pneumatic frameworks rather than water driven frameworks fluid show more noteworthy inactivity than gases. In this way in water powered framework the heaviness of the oil is a potential issue. The outline and improvement a materials dealing with framework for computerization or semi robotization of ventures by utilizing pneumatic control framework which is utilized for ease mechanization.

3.3 PISTON ROD:

The cylinder pole is round in cross segment. It associates cylinder with cylinder of other chamber. The cylinder pole is made of gentle steel ground and cleaned. A high complete is fundamental on the external pole surface to limit wear on the bar seals. The cylinder bar is associated with the cylinder by mechanical securing. The cylinder and the cylinder pole can be isolated if vital. One end of the cylinder bar is associated with the base of the cylinder. The opposite end of the cylinder bar is associated with the other cylinder bar by methods for coupling. The cylinder transmits the working power to the oil barrel through the cylinder bar. The cylinder pole is

intended to withstand the high compressive power. It ought to abstain from twisting and withstand.

3.4 CYLINDER COVER PLATES:

The chamber ought to be encased to get the connected weight from the compressor and follow up on the pinion. The barrel is in this manner shut by the cover plates on both the finishes with the end goal that there is no spillage of air. A delta port is given on the best cover plate and an outlet ports on the base cover plate. There is additionally an opening bored for the development of the cylinder. The chamber cover plate shields the barrel from clean and other molecule and keeps up a similar weight that is taken from the compressor. The spine needs to hold the cylinder in both of its extraordinary positions. The cylinder hits the best plate amid the arrival stroke and winds up in a real predicament plate amid end of forward stroke. So the cover plates must be sufficiently solid to withstand the heap.

3.5 FLOW CONTROL VALVE:

A stream control valve directs the stream or weight of a liquid. Control valves ordinarily react to signals created by free gadgets, for example, stream meters or checks.

Control valves are regularly fitted with actuators and positioners. Pneumatically-impelled globe valves are broadly utilized for control reason in numerous enterprises, control valves stick additionally work with water powered actuators. These kinds of valves are otherwise called Automatic Control Valves.

The water driven actuators will react to changes of weight or stream and will open/close the valve. Control Valves don't require an outside power sources, implying that the liquid weight is sufficient to open and close the valve.

3.6 AIR SUPPLY:

The air supply for a jackhammer as a rule originates from a compact compressor driven by a diesel motor. Responding compressor were earlier utilized. The unit involved a responding compressor driven, through a diffusive grip by a diesel motor. The motor's representative given just two rates:

- Idling, when the grip was separated
- Maximum, when the grasp was locked in and the compressor was running

Current adaptations utilize rotating compressor and have more complex variable governors. The unit is generally mounted on trailer and once in a while incorporates an electrical generator to supply lights or electric power devices. Makes of compact compressor sold in the UK incorporate chart book copco, think about and Ingersoll rand.

3.7 BASE:

The base structures the stage for every other part to rest. The segment and the working table will be put over the base. The segment will be welded over the base at required place. The directional control valve is set at the opposite end of the base which controls the development of the pneumatic chamber. The base gave the physical structure and inflexibility to the whole framework. The base is painstakingly made such that it ought to be straight which gives uniform arrangement.

3.8 SOLENOID VALVE:

Solenoid valves are utilized as a part of liquid powder pneumatic and pressure driven frameworks, to control chambers, liquid power engines or bigger mechanical valves. Programmed water system sprinklers frameworks additionally utilize solenoid valves with programmed controllers. Solenoid valves are utilized as a part of the paint ball industry, solenoid valves are normally alluded to just as "solenoids." They are regularly used to control a bigger valve used to control the charge furthermore, these valves are presently being utilized as a part of family unit water purifiers.

Solenoid valves can be utilized for a wide cluster of mechanical applications, including general on-off control, alignment and test stands, pilot plant control circles, process control frameworks, and different unique hardware producer applications.

3.9 PARTS OF A SOLENOID VALVE:

1. Loop:

The solenoid loop is made of copper wire. The layers of wire are isolated by protecting layer. The whole solenoid curl is secured with a varnish that isn't influenced by solenoid dampness. Cutting oil or regularly fluids. coils are evaluated in different voltages, for example, 115 volts AC, 230volts AC, 460volts AC, 575volts AC. 6volts DC, 12volts DC, 24

volts DC, 115volts DC and 230 volts DC. They are intended for such frequencies as 50Hz to 60 Hz.

2. Edge:

The Solenoid Frames Serves a few purposes. Since it is made of covered sheets, it polarized when the present goes through the loop. The polarized curls draw in the metal plunger to move. The casing has arrangements for connecting the mounting they are normally catapulted or welded to the casing. The casing has arrangements for beneficiaries the plunger. The wear strips are mounted to the solenoid outline. What's more, are made of materials, for example, metal or imaged less fiber fabric.

3.9 SOLENOID PLUNGER:

The solenoid plunger is the mover system of the solenoid. The plunger is made of steel covers which are bolted together under high weight, so that there will be no development of the overlay as for each other. At the highest point of the plunger a stick opening is set for making an association with some gadget. The solenoid plunger is moved by an attractive power one way and its for the most part returned by spring activity. Solenoid worked valves are normally given cover either the solenoid or the whole valve. It shields the solenoid from soil and other remote issue, and secures the actuator moreover. In numerous applications it is important to utilize explosion confirmation solenoids.

3.10 ACTUATORS:

It changes over vitality put away in the compacted air into mechanical movement. A Linear cylinder is appeared. Substitute devices incorporate rotational actuators, air apparatuses, extending bladders, and so on control unit: It is utilized control the solenoid by ON and OFF valve. To the prerequisite of wind current in encourage approach to in and out for the working of pneumatic chamber

4. OPERATION

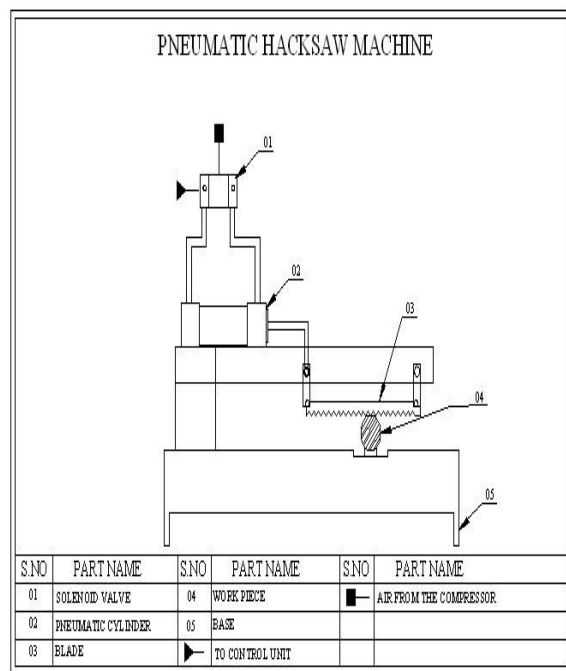
GENERAL:

Compacted air goes into the tube toward one side of the cylinder and, power on the cylinder. Therefore, the cylinder winds up noticeably moved by the compacted air extending in to achieve climatic weight.

COMPRESSIBILITY OF GASSES:

Pneumatic chambers need to do with the compressibility of a gas. Furthermore, how to exactness of a pneumatic barrel can be influenced as the heap following up on the chamber tries to additionally pack the gas utilized.

5. DESIGN AND DRAWING



6. WORKING PRINCIPLE

The compacted air from the compressor comes to the solenoid valve. The solenoid valve alters the course of stream as indicated by the signs from the actuator. The compacted air goes through the solenoid valve and it is conceded into the front end of the barrel piece. The air pushes the cylinder for the cutting stroke. Toward the finish of the cutting stroke air from the solenoid valve achieves the backside of the chamber square. The weight continues as before however the region is less because of the nearness of cylinder pole. This applies more noteworthy weight on the cylinder, pushing it at a quicker rate subsequently empowering speedier return stroke. The weight connected toward the finish of the hacksaw outline gives consistent burdens which bring down the hacksaw to empower ceaseless cutting of the work. The stroke length of the cylinder can be

changed by making suitable alteration in the actuator.



PHOTOGRAPHY

6.1 RUNDOWN OF MATERIAL

- Control unit
- solenoid valve
- Pneumatic chamber
- Hack saw
- Air compressor
- Handle
- Pressure Regulator
- Connecting ports
- Houses
- Actuator

7. CONCLUSION

It is realized that traditional power hacksaw machine can be supplanted with robotized control Hacksaw machine. Robotized control hacksaw machine gives high efficiency in brief day and age in examination with the traditional power hacksaw machines. The significant favorable position of this machine is mediation of work is diminished to most extreme level. In this fast developing modern area the utilization of energy Hacksaw machine is wide, time and work assumes a noteworthy part underway process. This can be overwhelmed by utilizing this sort of computerized machines.

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