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Pneumatic Bearing Puller Machine

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Abstract - These days pneumatic framework assumes a significant part in practically all application. As in car businesses, little assistance place, airplane enterprises where accuracy is required. Customary strategy for bearing expulsion or establishment is pounding which leads to a few issues. The risky and inordinate pounding cause harm of bearing surface or now and then opportunity to disappointments. The adjustment is made which makes simple evacuation and establishment of bearing. Pneumatic bearing puller and pusher which is based on Pascal regulation "pressure dispersion in an encased chamber is uniform toward all path"is created to tackle the ordinary pounding process. This venture is mostly engaged to decrease the human exertion and the mileage that happens while mounting and unmounting a heading. Thus, this can executed in auto businesses, studios, also in different processing plants where direction might be a piece of theitem.

Keywords – Pneumatic System, Excessive Hammering, Pressure Distribution.

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1. INTRODUCTION

A bearing is a machine element that constrains relative motion to only the desired motion and reduces friction between moving parts. They are mostly associated with the rotating members. The wide user of bearings is the Automobile industry where the bearings are used in the engines, transmission system, and steeringsystem and in other areas where rotation involves. The mounting and unmounting of a bearing from an engine or from a shaft is a tedious job as the conventional method is hammering which involves lot of human effort and there are many chances for bearings to get damaged. So to reduce these ambiguities the solution is brought with the help of pneumaticsystems where air pressure is utilised to mount and unmount the bearings. This is achieved by using a pneumatic cylinder which is operated using a compressor and the plunger of the pneumatic cylinder is fitted with the corresponding pusher or puller depending upon the needs.The pneumatic cylinders are available in different ranges of operating pressures, so depending upon the load requirements the pneumatic cylinder can be chosen. The setup requires only less operating space and it is also portable, so that it can be connected with compressors which may be at different spots in an industry. This also consumes less time thereby increasing the productivity. The control of the Pneumatic cylinder is a hand lever valve which is used to determine forward or return stroke of the plunger fitted with the pusher or puller. The frame is so designed to house an engine casing and provisions for fixing vice to hold shafts. The pneumatic cylinder is fitted vertically by providing two columns in the either sides and a horizontal plate at the top.

2. LITERATURE REVIEW

1. Nikolay A. Markov, Ilya A. Shipitko, Taras V. Benzrushko, Synthesis of the Position Controller for the Pneumatic Actuator, Siberian Conference on Control and Communications SIBCON, 2009 This journal deals with the positions of pneumatic actuators and its merits overotheractuators.Pneumaticactuatorsofferseveral advantages over electromechanical and hydraulic actuators for positioning applications.

2. Rakesh Y. Suryawanshi, Pranay S. Ramteke, Niraj Patil, Deepak Kumar, Dr. A.V. Vanalkar Design and Fabrication of Hydraulic Bearing Puller and Pusher IJIRST –International Journal for Innovative Research in Science & Technology| Volume 1 | Issue 11 | April 2015 ISSN (online): 2349-6010. This journal deals with the installation and removal of bearings with the hydraulic effort and how the hydraulic cylinders and control valves are installed for the effective mounting and unmounting of bearings.

3. COMPONENTS DESCRIPTION

3.1 PNEUMATIC CYLINDER

Pneumatic cylinder(s) (sometimes known as air cylinders) are mechanical devices which use the power of compressed gas to produce a force in a reciprocating linear motion.

Pneumatic cylinder

3.2 FLOW CONTROLVALVE

A flow control valve regulates the flow or pressure of a fluid. Control valves normally respond to signals generated by independent devices such as flow meters or temperature gauges.

Flow controlvalve

3.3 HAND LEVERVALVE

Hand lever valves for directional control are one of the most fundamental parts in hydraulic machinery as well as pneumatic machinery. They allow fluid flow into different paths from one or moresources.

3.4 AIR HOSE

A hose is a flexible hollow tube designed to carry fluids from one location to another.

3.5 CONNECTORS

Air hose connectors, as the name implies, are small gadgets or devices that allow a flexible tube or pipe to be linked with compressors on one end of the tube, as well as with other devices that facilitate the delivery of compressed gas on its oppositeend.

Air Hose Connectors

3.6 BEARINGS

A bearing is a machine element that constrains relative motion to only the desired motion and reduces friction between moving parts.

Bearings

3.7 BEARINGPUSHER

As the name suggests, bearing pusher is used to mount a bearing in a shaft or in any other

components like engine cases by giving a push force on the bearing surface.

Bearing Pusher

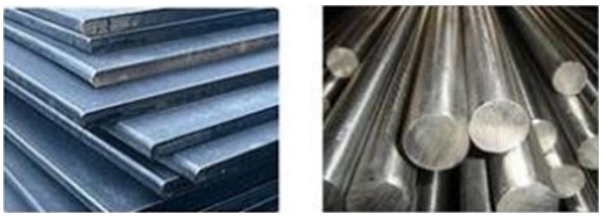
3.8 BEARINGPULLER

A bearing puller is a tool used to remove bearing sets from a rotating machine shaft or from a blind bearing hole.

Bearing Puller

3.9 MILD STEELMATERIALS

Mild steel (iron containing a small percentage of carbon, strong and tough but not readily tempered), also known as plain-carbon steel and low-carbon steel, is now the most common form of steel because its price is relatively low while it provides material properties that are acceptable for manyapplications.



Mild Steel

3.10 BOLTS ANDNUTS

A bolt is a form of threaded fastener with an external male thread. A nut is a type of fastener with a threaded hole. Nuts are almost alwaysused in conjunction with a mating bolt to fastenmultiple parts together.

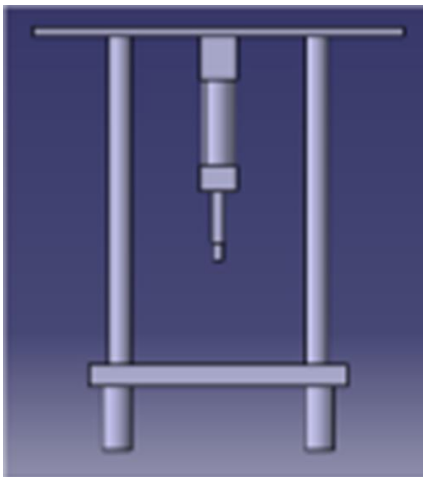
Bolt and Nut

3.11 VICE

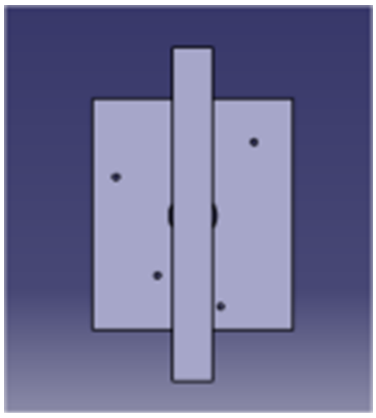
A vice is a mechanical apparatus used to secure an object to allow work to be performed on it. Vices have two parallel jaws, one fixed and the other movable, threaded in and out by a screw and lever.

WORKING: After connecting the arrangements properly, switch on the compressor which act as the input for thepneumatic cylinder. The compressed air from the compressor is then send to the hand lever valve through the filter regulator lubricator [FRL]. FRL removes the dust particles from the compressed air and helps us to set the required amount of air pressure needed for the operation. Then turn on the FRL and set the required air pressure. Now the air comes to the hand lever valve. Hand lever valve act as the direction control of the air. When the hand lever valve is moved forward, the pressure of air goes to the bottom port of the cylinder and this makes the piston rod of the cylinder to move in the forward direction .when the hand lever valveismoved towards reverse, the pressure of air goes to the top port of the cylinder and thus makesthe piston rod of the cylinder to move in the reverse direction. On the both ports of the cylinder the flow control valve is fixed which helps us to control the movement of the piston rod.

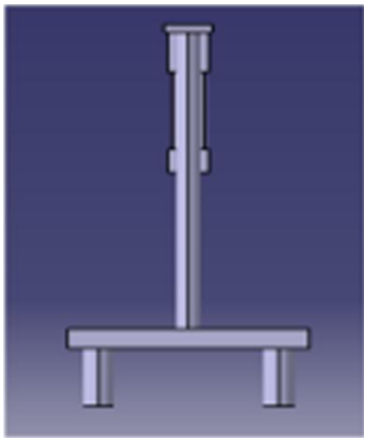
LINE DIAGRAM



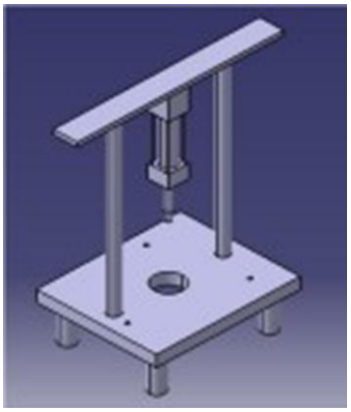
Front View



Top View



Side View



Isometric View

File Component

4. CONCLUSION

The project work has been completed successfully. The project hardware functions satisfactorily as per the design. The project work was developed after conducting a number of experiments before finalizing the design work which reduced the bottle necks. Using this project, the bearings can be easily mounted and uncounted with less efforts and also in safer manner. As the initial cost and maintenance cost are low, it is useful in workshops and small scale industries. are low, it is useful in workshops and small scaleindustries.

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