

Fabrication of Pneumatic Punching and Bending Machine Powered by Solar Panel

K Mariyappan, Santhosh V, Abinav Krishna A, MD Fyazuddin S

Department of Mechanical Engineering, Vel Tech High Tech Engineering College, Chennai, Tamil Nadu, India

ABSTRACT

The sheet metal is majorly used in automobile and medical platforms. These are used in several places mainly, in small scale industries because the cost of hydraulic machine is not affordable in small scale industries. It gives major advantage in cost reduction. Therefore, many small scale and medium scale industries involving in sheet metal operations, punching, and bending works. This process is done by using compressor so the pressurized air is used in the process. This concept is used in construction and mechanical industries. Small scale mechanical industries and others which change sheet metal into various shapes by many operations such as cutting, punching, bending, blanking, trimming etc. Using different machining as per our search there is no machine which has bending and punching machine. The main drawback of this process is which is not having continuous power supply so we have concluded to make a supporting machine which can do both bending & punching operations in a same machine by using solar energy in this method we can overcome the lack of continuous power supply.

Keywords: Pneumatics, Solar, Punching, V bend

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I. INTRODUCTION

Nowadays the small scale and medium scale industries making a rising process of making different types of metal sheet. The requirement of punching and bending has major role in it Punching is the most cost-effective process for making holes in metal sheet pieces. Punching is able to create holes in a variety of shapes. If a manufacturing company needs a hole in a specific shape, it can simply use a die in that shape and bending machine is referred to as a primarily used machine which is mainly used to make a bend on any required work piece. The machine is used to make use of the bending tool which is present in it and is responsible

for the process. So, now “Fabrication of Pneumatic Punching and Bending Machine powered by Solar Panel” is making both operations by using natural energy of solar. In this, the solar thermal energy uses the energy from the sun stored in a battery. This allows more sunlight to be captured. By this the solar energy is capable of producing mechanical energy solar panel requirement significant growth between the year of 2008 and 2013.



Due to that growth many start-ups had projects that were not "ideal" solar roof tops to work with and had to find solutions to shaded roofs and orientation difficulties. This challenge was initially addressed by the re-popularization of micro-inverters and later the invention of power optimizers. A solar cell panel, photo-voltaic (PV) module or solar panel is an assembly of photovoltaic cells arranged in a framework for gathering energy. Solar panels use sunlight as a source of energy to generate direct current electricity. A collection of PV modules is called a PV panel, and a system of PV panels is called an array the Double Acting Air Cylinder has two port barrels without spring.

Whenever requires to operate the Double Acting Cylinder, compressed air passed through the barrel through the first port, that air pushes the piston head forward and when it requires to send back to the same back position & stop the flowing air from the first port and passed the compressed air from the second port, that compressed air from second port sends back piston to its original position. Compressors as the same purpose as pumps. Where compressor use for pressurized air and pumps use for pressurized fluid both increase the pressure on a source and both can transport the source through woes.

The main distinction is that the focus of a compressor is to change the pressure force which is mostly only achievable on gases. Gases are compressible, so main

action of a pump is to pressurize and transport air. The energy contained in the compressed air can be used for variety of application's, utilizing the kinetic energy of the air it is released and the depressurizes when tank pressure when it reaches the lower limit the air compressor turns on and re-pressurizes the air.

PIPE BENDING:

Today's sector will all benefit from automated, cost-effective and precise machinery. There are several different typer of pipes bending equipment on the market, including hydraulic,pneumatic,and manual machines. A fully automatic pipe bending equipment is revealed in the utility model. A foundation with four supporting legs that are strong enough to carry the weight and force of the machine supports the entire apparatus. The bottom pulley is carried by clamps that hold parallel shafts together at the base. A dc motor with a chain drive system drives the pulleys. Here, the working pulley is guided by two guided ways for both up and down linear motion. Lead screw is acting as a source of motion for the pulley between two horizontal supporting plates that are attached to the frame with the aid of two vertical parallel supporting plates are a guide way and a lead screw. Transformer, rectifier, capacitor,and display make up the microcontroller unit. The application range is broad, the manufacturing cost is decreased, and the production efficiency is increased. In ductile materials, most frequently sheet, bending is manufacturing. Solar energy is operation that yields a V-shape-shape, or channel from along a straight axis.

SOLAR ENERGY:

Primarily visible light and heat from the sun that is made using the range of technologies such as solar power to gain electricity, solar thermal energy including solar water heating,and solar architecture.It is a key renewable energy source , and depending on how solar energy is distributed, stored,and transformed into electricity, its technologies are often categorized as passive or active solar. One of the active

solar technologies is the photo-voltaic system. Example of passive solar strategies include orienting a building towards the sun, utilizing material with favorable thermal mass or light-dispersing properties, and designing naturally ventilated space. Solar energy is particularly enticing source of electricity due to the abundance of it. Solar energy is now more economical than fossil fuels since 2021 the development of affordable, unrestricted, and clean solar energy technology, according to the international energy agency, would have huge long-term benefits in 2021. It would increase country's energy security by relying on a domestic, inexhaustible and mainly import-free supply additionally, it will increase sustainability, reduce pollution, and lower the cost of addressing global warming. Small photovoltaic cells are frequently employed in low-power devices like watches and calculators because they can produce electricity from either ambient or artificial light. Larger units have been used to power water pumps, remote communications systems, and weather communication satellites. Buildings-integrated photo-voltaic are a cutting-edge thin-film solar cell technology that homeowners and businesses may install on their roof tops to complement or replace the conventional energy source with.

II. OBJECTIVES AND IDEAS

Our ideology is to provide punching and bending machines in a single machine to reduce the cost effectiveness by making it power driven by solar energy which is naturally available. Punching offers to create different types of holes according to the requirement and bending tends to make a bend on any work piece. The whole procedure is made efficient where punching and bending can be done alternatively in a single operated machine to complete the work in the shortest amount of time.

SCOPE OF THE PROJECT:

The project is mainly focused on creating an impact on the small scale industries which is one of the largest growing sectors. Punching and bending being one of the important activities that take place in a small scale industry this project paves the way for efficiency in the work done with the requirement of much less time to complete the work rather than doing the processes separately. The solar power driven factor adds on as an additional feature for reducing the cost for running the machine along with the eco-friendly aspect.

III. WORKING

Pneumatic Cylinder: Pneumatic cylinders, also known as air cylinders, are mechanical devices that generate force in a reciprocating linear motion using the power of compressed gas. Similar to hydraulic cylinders, a piston is propelled in the desired direction by an external force.



Pneumatic Hose: Pneumatic hose and tubing is used to deliver pressurized air to actuators.

Pneumatic Nipple: Pneumatic nipple is a fitting, consisting of a short piece of pipe, usually provided with a male pipe thread at each end, for connecting two other fittings.

Free-Wheel & Chain: A freewheel or overrunning clutch is a transmission component used in mechanical or automotive engineering that separates the

driveshaft from the driven shaft when the driven shaft rotates more quickly than the driveshaft

Square Tube: Square tubes are frequently utilized for structural and maintenance purposes.

Clamp: A clamp is a type of fastener used to apply pressure from the inside to tightly hold or secure things together in order to prevent movement or separation.

5/2 DCV: DCVs allow the flow of fluid (hydraulic oil, water, or air) from one or more sources into various routes.



Solar Panel: A collection of photovoltaic cells arranged in a framework for installation is known as a solar cell panel, solar electric panel, photo-voltaic (PV) module, or solar panel. Solar energy is harnessed by solar panels to provide direct current power.

Handle: An object's handle is a feature or attachment that enables hand manipulation and grasping.

IV. CONCLUSION

The project we completed will leave a lasting impression in the world of small scale industries. The ability for the staff to complete the tasks on a single machine is quite helpful. Additionally, this effort has decreased the expense associated with the issue. This has been planned to complete the necessary work in the shortest amount of time. This paper discusses a technique for managing punching machine activities. Pipe bending is a frequent occurrence today. In mass production, numerous automatic and semi-automatic

bending systems are employed. However, automated and semi-automatic pipe bending equipment is pricey for small-scale production. In places with expensive and little electricity, they are still unable to be used. Contrarily, manual pipe bending is less expensive to build and operate. In this article, the plans, development, and performance tests are all illustrated. Solar functions at its best, despite the fact that pneumatic systems are superior in terms of accuracy, cost, and maintenance.

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