

ELECTROMAGNETIC PUNCHING MACHINE

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ABSTRACT

Punching gadget is one of the foremost machines in paper slicing enterprise & sheet metallic industry. It's far specifically used as the call shows to cut strips. So we are going to make a machine for "punching industries" and make it multipurpose & ought to be used to reduce the card board, asbestos sheets, papers, foam, and skinny plastic sheets. The machine is straightforward to hold, easy to operate. Subsequently we tried our fingers on "computerized punching system". Automated punching machine is operating at the precept of electromagnetic. This form of punching machine is used to punch basically card board, asbestos, sheets, papers, foam, and skinny plastic sheets. Punching is rely upon feed fee which accomplished manually. The best project confronted by way of an engineer is to overcome the power wasted because of friction in any mechanical method. In a conventional punching method, mechanical or hydraulic pressure is used to function the punch which entails huge quantity of metallic to metal contact inside the drive gadget additives, as well as inaccuracy in the manager of the punching forces on the micro degree. This paper introduces the primary construction of an electromagnetic assisted punching machine to perform the punching operation. After a success fabrication, the set up was tested and the punching pressure produced becomes tested.

Keyword:-Punching device, Sheet metallic, automated operation.

1. Introduction:

Punching is metallic forming manner that uses a punch press to force a tool, known as punch. This form of punching machine is used to create a hollow in thin cork sheet, asbestos, plastic sheet and greater material as in line with the ability of electromagnet. Commonly in conventional punching method like mechanical, hydraulic and pneumatic pressure is used to operate the punch in which creates massive amount of friction; in addition to inaccuracy to perform the micro level operation. Punching is a steel forming procedure that uses a punch press to pressure a device, referred to as a punch, thru the work piece to create a hollow thru shearing. The punch regularly passes thru the work right into a die. A scrap slug from the hollow is deposited into the die in the process. Relying on the fabric being punched this slug can be recycle and reused or discarded. Punching is the most inexpensive technique for creating holes in a sheet metallic for medium to high production prices. In forging packages the work is frequently punched whilst hot, and this is known as hot punching. A punch is regularly made of hardened metal or carbides. A die is positioned on opposite aspect of the work piece and enables to localize the shearing pressure for a purifier facet. There's a small quantity of clearance among the punch and the die to save you the punch from sticking on to the die. Sheet steel is in reality metal shaped into skinny and flat pieces. It is one of the essential bureaucracy utilized in metalworking, and may be cut and bent into a spread of different shapes. Infinite ordinary gadgets are constructed of the material. Thicknesses can vary extensively, although extraordinarily skinny thicknesses are considered foil or leaf, and pieces thicker than 6 mm (0.25 in) are considered plate.

2. Functional Details Of Structure

2.1 Components

2.1.1 Electromagnet

Electromagnet is the main part which is used to generate electromotive force when DC power supply given to Electromagnet then metal sheet gets punched efficiently.

2.1.2 MS Plate

Three square feet plate is used to attract electromagnet.

2.1.3 Spring

Spring is used to retract the electromagnet after punching compression spring is compressed when electromagnet get attracted by ms plate and after DC power cut off it retracted by compression spring.

2.1.4 Round Pipe, Square pipe

We have used two types of pipes round pipe and square pipe. Round pipe is used to support the frame and square pipe is used to hold punch.

2.1.5 Die and Punch

Die and Punch are also main parts of our system which is used to punching operation.

Die is used to hold the work metal sheet and punch which is connected to electromagnet it goes downward after giving DC power supply to electromagnet and sheet metal get punched efficiently.

2.1.6 Battery, switch, copper wire

Battery of 12V we used for DC power supply which gives 7.5A current to electromagnet to generate electromotive force in it. Switch used for on/off the power supply and copper wire is used for connections.

2.1.7 Plunger

Plunger is used for the movement of pipe which is connected to the electromagnet and at the end of pipe punch is connected for sheet metal punching.

2.1.7 Electric DC power supply

Electric DC power supply given to the electromagnet for generating electromotive force for the punching of metal sheet.

2.2 Construction

Our project is related to punching operation. Punching is the important process in production industries. Firstly we constructed the frame structure in which below the MS plate we fitted the electromagnet. 12V DC power supply is given to electromagnet. Square pipe is connected at the centre of MS plate and at the end of square pipe punch is connected. At the end of frame structure we connect die for holding the sheet metal work piece.

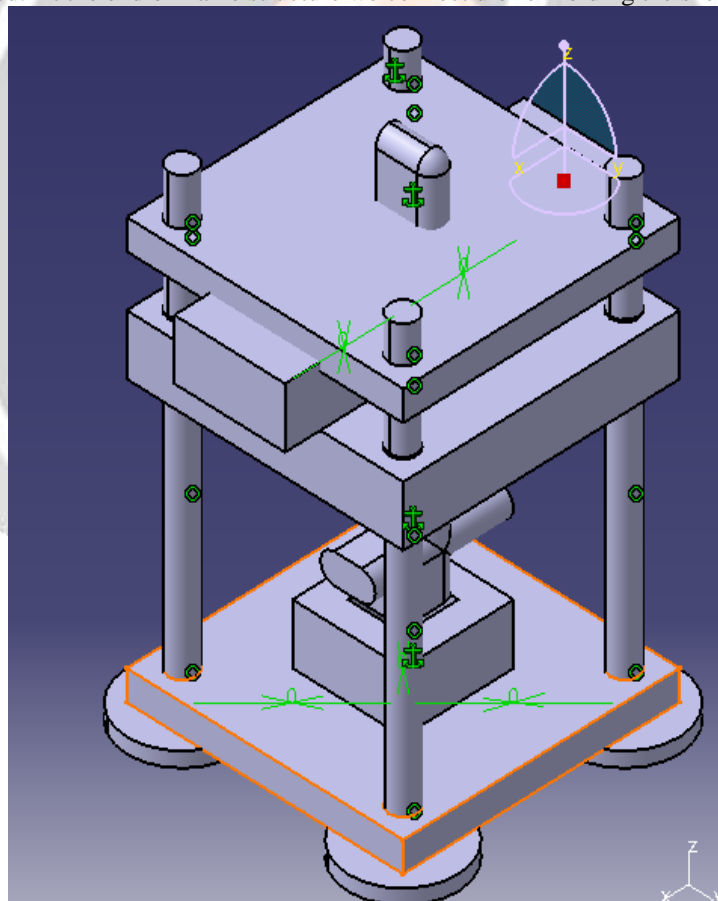


Figure 1. Structural setup of Electromagnetic punching

2.3 Working

The principle reason electric deliver to the electromagnet is to generate the electromotive pressure. Via this pressure the M.S. plate draws closer to the electromagnet and it's going to generated force on punch to make a hollow. Whilst electrical deliver to the electromagnet is get stopped or reduce off. The compressed spring now exerts pressure at the vertical bar and lifts it up, allowing the operator to dispose of the paintings piece and load every other work punching device up, so that the work piece may be loaded impediment of our spring is

twofold. After the punching, the spring is used for a go back mechanism to push the punching tool up. Then work piece has were given punched efficaciously.

3. ADVANTAGES, LIMITATIONS & APPLICATIONS

3.1 Advantages:-

1. Friction loss is very minimum because of little or no steel- metallic touch within the force device.
2. The pressure created per punch can be controlled precisely as it is an electrical technique.
3. It is very compact device.
4. Its miles portable.
5. Form of operations can be accomplished via just the usage of different dies i.e. its miles a flexible setup.

3.2 Limitations:-

1. Not suitable for punching of sheet metal have thickness over 8mm.

3.3 Application:-

- 1) Punching of froth for packaging add-ons.
- 2) Punching card board from 1mm to 5mm.
- 3) It can be used to punching the asbestos sheet for gasket sheet.
- 4) Its miles used to punching a plastic sheets and paper.

4. CONCLUSION

This machine may form a simple solution for punching in the future. This machine also can be controlled by computer programs. This type of m/c provides work practically at low cost, low maintenance, low capital investment in less space. It also gives value for money.

As work was successful studying & completing the results of this automatic electromagnetic punching m/c with solving other types of conventional punching machine problems associated with machine that can be implemented from higher to lower units cost.

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