

FABRICATION OF PAPER PUNCHING MACHINE USING GENEVA MECHANISM

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ABSTRACT

The objective of Automatic Punching Machine project is to make automatic punching machine for industrial and automobile parts with the help [Geneva mechanism](#). The punching machine of this invention comprises a punching head provided with a plurality of punch/die pairs for effecting punching operations of a metal sheet. In the punching head there are defined a plurality of operative positions in each of which there is positioned and actuated a punch/die pair of the said plurality of punch/die pairs. Each punch/die pair is operated independently from the others. The punching machine further includes a numerically controlled programmable manipulator equipped with pincers for gripping a metal sheet and displacing it between the punch and dies of said plurality of punch/die pairs.

INTRODUCTION

The present invention relates to an automatic punching machine using Geneva mechanism, particularly one suitable for performing punching of a metal sheet in a programmed and programmable manner according to a predetermined number of different punching shapes.

The punching machine of this invention is of the type comprising a punching head provided with a plurality of punch/die pairs for effecting the desired punching of a metal sheet, and a numerically controlled programmable manipulator, equipped with gripping means for the said metal sheet, for displacing it over a horizontal plane passing between the said punches and their associated dies. In known punching machines of the said type there exists a single, well determined and unchangeable operative position, into which each punch/die pair is carried by appropriate automatic means and retained for the time necessary for the execution of all the punching of the same predetermined shape envisaged in a metal sheet.

In operation of such a known punching machine using Geneva mechanism, whilst a first punch/die pair is maintained in the said operative position the manipulator causes the displacement of the metal sheet in such a way that the said pair performs the predetermined number of identical punching in a corresponding number of predetermined and different positions in the said metal sheet. Once this first series of punching has been completed the punch/die pair first considered is replaced with another pair of different shape to effect a second series of punching on the same metal sheet. This mode of operation, which is tied to the structural and functional characteristics of the known punching machine and, above all, to the fundamental characteristic consisting in a single and unchangeable operative position, involves dead times which until now were inevitable, for the substitution of the punch/die pair in the operative position, as well as a not inconsiderable consumption of time tied to the movements which the manipulator must perform in order to displace a metal sheet during the operation of successive punch/die pairs.

METHODOLOGY:

This project is designed with using Geneva mechanism, moving arrangement and punching mechanism. Punching machine is designed with mechanical arrangement in which movements are controlled by using Geneva

mechanism. Moving mechanism is attached with punching spindle. So we can move the punching spindle anywhere within the area of machine. Moving mechanism also controlled using Geneva mechanism.

In this punching machine using Geneva mechanism consists of two sections. One is automatic punching mechanism and the second section is conversion of rotary motion into linear reciprocation motion of punching tool. The first sections consist of Geneva wheel disc keyed with a shaft of one end and the other end is connected to chain sprocket wheel. This Geneva wheel shaft is supported on two Plummer block bearings. This sprocket wheel transmits the rotary motion from the Geneva wheel.

WORKING :

When the motor is powered the cam drive disc is rotated. The linear rod which is attached to the cam drive disc with eccentricity from the center is reciprocated on the punching machine. The punching machine consists of a punch head, when the linear rod is moved down it presses the punch head. The punch head consists of punch tools which punches the paper in required manner. The cam drive disc has a pin attached to it, which enters into the slot of the Geneva wheel and turns the Geneva wheel. For every one rotation of cam drive disc, the Geneva wheel rotates 1/4th of the rotation. The shaft of the Geneva wheel is attached to the sprocket wheel. When the Geneva wheel rotates, the sprocket wheel also rotates which in turn rotates the rollers attached to the other sprocket wheel. The two sprocket wheels are connected by a roller chain. With the help of rollers the paper moves forward and the punching operation is done on it.

CONCLUSION:

The project carried out by us is used to make punching on paper and G. I. Sheet with more prescribed than a conventional punching machine. As conventional punching machine takes more time for Job setting, Marking, Punching operation. Labor cost is also more. With this Geneva wheel based auto roll punching machine the time taken for all this process can be reduced and production time also reduced and production rate will be high. No extra skill is required for operating this system. Operation is very smooth and in this system we can get more output by applying less effort. It is very much useful for making series of holes of same diameter and constant pitch. Thus it can be useful for punching application.

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