DESIGN AND FABRICATION OF AUTOMATIC BAR FEEDING MECHANISM

Artralarasan #1, Pravin Joseph Rajkumar.S 2*, Sivanesh.M 3*, Selva Arasan.D 4*

#1# Assistant Professor, Mechanical, Kings Engineering College, Chennai, India
2* Student, Mechanical, Kings Engineering College, Chennai, India
3* Student, Mechanical, Kings Engineering College, Chennai, India
4* Student, Mechanical, Kings Engineering College, Chennai, India

Abstract - This project is mainly based on designing and fabrication of Automatic bar feeding mechanism. The main aim of this work is to improve production rate, reduce man power, improve quality etc. The design calculations are performed in order to provide a safer design. This work is integrated with an ECU unit which will provide an automatic control over the bar feeding mechanism.

I. INTRODUCTION

Nowadays almost all the manufacturing process is being automated in order to deliver the products at a faster rate. In previous years all the process used hundred percent man power and had no machines to perform a task. With the developing technology few machinery were developed in order to decrease human power. Nowadays with the rapid technology growth 80% of the work being done in industries are being automated. Thus only fully automated or semi automated machine are given preference by the companies. The manufacturing operations are being automated for the following reasons. To achieve mass production, To reduce man power, To increase the efficiency of the plant, To reduce the work load, To reduce the production time, To reduce the production cost, To reduce the material handling, To reduce the fatigue of workers, To achieve good product quality, less maintenance.

A bar/sheet feed mechanism for a machine tool provides a greater support in feeding the sheet or bar in a easy manner in such a way that the usage of human power is reduced to a greater extend. This mechanism will mainly be used in sheet metal rolling machines, sheet metal cutting machines, bar feeding machines with small alterations etc. Cutting operation is widely used in workshop practice for applications carried out in conventional machine tools, as well as in NC and CNC machine tools, machining centers and related manufacturing systems.

II. WORKING PRINCIPLE

A wiper motor is used and pinion pulley is connected to the motor shaft and it transmits the motion to the larger pulley with the help of v-belt. This is done in order to provide speed reduction. The pinion gear is connected to the larger pulley shaft. Now it transmits the power to the roller by meshing it with the larger wheel. A roller connected to the shaft of second gear helps in moving the bar forward.

When the motor is switched ON, the power gets transmitted to the pinion pulley and then it gets transmitted to the larger pulley. Now the pinion gear connected to the wheel gear transmits the power to the second gear and it gets transmitted to the pulley. Here a ECU unit is established in order to allow the automatic control of the motor used. Here a microcontroller is used which automatically program the time of ON and OFF. A relay circuit is used in order to control the ON and OFF of the motor.

III. NEED FOR AUTOMATION

Automation can be achieved through computers, hydraulics, pneumatics, robotics,
kinematics etc. Of these this project has used basic mechanisms.

The main advantage of this system is that it is economical, cheap and simple in construction which makes it different from other sources of automation.

Automation plays an important role in mass production. Nowadays almost all the manufacturing process is changing to automated machines in order to deliver the products with better quality and at a faster rate. The manufacturing operation is being automated for the following reasons.

- To achieve mass production
- To reduce man power
- To increase the efficiency of the plant
- To reduce the work load
- To reduce the production cost
- To reduce the production time
- To reduce the material handling
- To reduce the fatigue of workers
- To achieve good product quality
- Less Maintenance

IV. PROPOSED METHODOLOGY IN SHEET CUTTER

The demerit of power sheet cutter is solved by using the automatic feeding of work-piece by feeding of work-piece, which directs the work-piece in to the cutter. The geared motor is stopped when it has been fed to a specified length into the work area.

After this, a pneumatic cylinder is extended to hold the work-piece firmly to arrest the movement of work-pieces when being cut. This is achieved by a solenoid operated DCV, controlled by microcontroller. Then the self-weight attached to the blade, which would be previously in a lifted position by means of another pneumatic cylinder will be lowered so that the sheet cutter blade will contact the work-piece at the point where the cutting is to be done.

This is achieved by retracting the weight-lifting cylinder operated by the same solenoid DCV. The cutting motor then gets turned on by the microcontroller, so that the blade is set to reciprocate on the work-piece to cut.

After a piece has been cut, the cycle begins again from automatic feeding without any human intervention and proceeds till the specified number of pieces are cut.

V. ADVANTAGES

- Simple in construction
- It is a compact in size
- Less Maintenance is required

VI. APPLICATIONS

- Used in small scale and medium scale industries
- Used as it reduces time of machining

VII. CONCLUSION

It is known that conventional method of feeding can be replaced with automated feeding mechanism. Automated feeding mechanism reduces feeding time and gives high productivity in short time period in comparison with the conventional method. The major advantage of this mechanism is that intervention of labour is reduced to maximum level. In this rapidly emerging Industrial era the use of older mechanism is wide, time and labour plays a major role in production process. This can be overcome by using this type of automated mechanism.

The automated feeding mechanism can be used at any of the industries like pump manufacturing industries that involve bulk amount of shafts that have to be machined frequently. For example the range of size of work-pieces that can be cut using the automated hacksaw machine can be varied by changing the blade size. For the present technology growth rate, manual technology will be a failure. Thus this automated bar feeding mechanism will play its major role in improving profit, reducing time etc. Thus this mechanism will help in developing present growing industries.

VI. REFERENCES