International Journal of Scientific & Engineering Research, Volume 8, Issue 2, February-2017
ISSN 2229-5518

ARDUINO CONTROLLED AUTOMATIC PAPER STAMPING MACHINE

Yusha Patel, Prajakta Atale, Maitri Shah; Prof. R.S. Deshmukh

Abstract— Automation has gained important place in the industries in last few decades. Majority of the automatic process came into existence to give better quality and highly accurate products. This project aims at developing a working model of an Arduino Controlled Paper Stamping Machine that works on an Arduino controller which controls feed and stamping mechanism of paper useful in many kinds of organization like Universities, Government offices, Post offices, Banks, Colleges etc. The feed of the paper will be accomplished using a roller mechanism and the stamping will be done by incorporating a simple link mechanism. Feed timing and stamp movement will be controlled by Arduino. We have proposed a system which can work with good accuracy, clarity, reduce the wastage of time and consume less power.

Index Terms— Arduino, Paper, Automatic, Stamping, Controller, Cross Platform, Inexpensive

1 INTRODUCTION

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Over the years Arduino has been the brain of thousands of projects, from everyday objects to complex scientific instruments. A worldwide community of makers students, hobbyists, artists, programmers, and professionals have gathered around this open-source platform, their contributions have added up to an incredible amount of accessible knowledge that can be of great help to novices and experts alike.
It is widely used as it provides following benefits:
Inexpensive - Arduino boards are relatively inexpensive compared to other microcontroller platforms.
Cross-platform - The Arduino Software (IDE) runs on Windows, Macintosh OSX, and Linux operating systems
Simple, clear programming environment - The Arduino Software (IDE) is easy-to-use for beginners, yet flexible enough for advanced users to take advantage of as well
Open source and extensible software - The Arduino software is published as open source tools, available for extension by experienced programmers.
Open source and extensible hardware - The plans of the Arduino boards are published under a Creative Commons license, so experienced circuit designers can make their own version of the module, extending it and improving it.

The project is basically an automation based control system done by integrating Arduino with paper stamping machine. This paper stamping machine basically deals with the conventional stamping done automatically with the help of controller which controls the motion of the stamp, paper feeding etc. The paper feeding for stamping is done by roller mechanism. Two rubber rollers hold the paper and feed it to the stamping tray by rolling the paper under it.
The stamping on the paper is done by two links joined together forming a sliding mechanism. Arduino controller is used to control the complete setup of this stamping machine from feeding of paper then stamping and finally till receiving the paper. Structure of the setup will be made of wood to ensure light construction.
The stepper motors will used as actuators. Motors will control the to and fro motion of the stamp mechanism.

- *Yusha Patel, Prajakta Atale, Maitri Shah; Prof. R.S. Deshmukh, Dept. Mechanical Engg.*
  Thakur College of Engineering & Technology.
  Mumbai, India

2 LITERATURE REVIEW

2.1 Automatic Punching Machine: A low cost approach ;(2014) Arun S, Sree Rajendra and Vijayavithal Bongale

The proposed work describes the design and fabrication of prototype of automatic punching machine controlled by PLC and shedding light on the working principle and the hardware structure of the system. Punching or pressing process is one of the most important and necessary processing step in sheet metal industry. By automating this process one can have a greater control over the process Programmable Logic Controllers are used for the control of the system. This system can replace existing manual feed and operated punching and pressing machines. By interfacing PLC controls with the conventional machines, it is possible to achieve good results in the form of reduced manufacturing lead time, reduced cost and increased safety of the worker.

2.2 Kinematic Design & Development of Automatic Paper Stamping Machine by using CAM & FOLLOWER Mechanism(2015-16);Raj Kumar Sharma, Rakesh Patwal, Rakesh Kumar Yadav, Vijay pratap

This project is basically an automation based control system. The project is done by integrating cam and follower driven stamping machine. This machine will run on several steps of process that is paper feeding, and stamping. The purpose of this project is to generate the correct sequence of events for a stamping machine by designing the cam and follower and by

controlling the motions of cam, conveyor and printer which is used for paper feeding with the help of some circuit mechanisms such as relays, electronic timers etc. The cost of stamping paper by the machine is very less as compare to the man. Time taken by the machine to stamp is more as compare to man. Our machine can stamp only A4 sheet (It depend upon printer) but man can stamp any size of paper. Machine can work for long hours without break but man needs break. Speed of machine to stamp is constant but the speed of man is decrease with time. Our machine required electricity to operate while man doesn't. Our machine can stamp only at specified position but man is flexible, so it can Stamp any position.

3 PROBLEM DEFINITION

To create an automatic paper stamping machine controlled by Arduino microcontroller which facilitates hassle free stamping thereby reducing human efforts, increasing accuracy & speeding up the process.

4 NEW APPROACH

Fig. 1 Proposed Model

Automatic paper Stamping:
Automatic paper stamping machine basically deals with the conventional stamping done automatically with the help of controller which controls the motion of the stamp, paper feeding etc.

Paper Feeding:
The paper feeding for stamping is done by roller mechanism. Two rubber rollers hold the paper and feed it to the stamping tray by rolling the paper under it. The rollers are mounted over a shaft which is housed inside bearings. This ensures the smooth functioning of paper feed process.

Stamping Mechanism:
The stamping on the paper is done by two links joined together forming a sliding mechanism. The stamp gets inked by the stamp pad in the first travel of the link and transfers the stamp to the paper in the second travel of the links. The traveling of the links is controlled by stepper motor

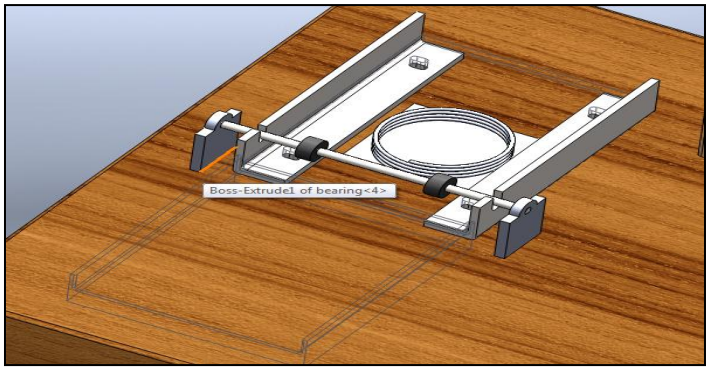

Fig. 2 Feeder Mechanism

Controller:
Arduino controller is used to control the complete setup of this stamping machine. From feeding of paper then stamping to receiving paper everything is controlled by Arduino. Arduino is an open platform used for programing and integrating our device with the computer. It is a very simple to operate and program

Structure & Actuators:
Structure of the setup will be made from wood. The stepper motors will used as actuators. Motors will control the to and fro motion of the stamp mechanism

Automatic Paper Adjustment Mechanism:
As the number of papers reduce, the base if lifted due to spring force to accommodate the height for reduced number of papers. The spring is exactly at the middle of the base and lifts or lowers it depending upon the number of papers.

Accommodate variety of paper:
Two L shaped brackets are provided to accommodate different types of papers having different widths. Slots are machined on both paper base and brackets which helps in bracket movement to adjust for different papers.

5 OBJECTIVES

Ease the process of stamping:
Stamping is a very tedious process wherein we need to manually ink the stamp and then stamp it on the paper, refill it for the other paper which consumes more efforts. Automation of stamping process ease the process of stamping and reduce efforts

Reduce Stamping time:
Automated stamping consumes less time than the manual stamping. Time saved can be utilized in some other work. Productivity of the process also increases

Contribution to our Institute:
It can be useful to our Institute for various stamping like journals, HOD, Principle Etc.

6 WORKING METHODOLOGY

The working methodology is proposed as the stack of paper is placed inside the feeder tray. The system starts and one by one paper are fed onto the stamping area. The stamping link hits the stamp pad and then hits the paper. The paper is then retrived by the roller mechanism. The paper one by one get stamped and the complete stack is lifted by spring under compression.

7 CONCLUSION

This stamping machine is very easy to use and it has smooth operation. It uses DC motors that operate the two rubber rollers thereby holding the paper and feeding it to the stamping tray by rolling the paper under it. The stamping on the paper is done by two links joined together forming a sliding mechanism. From feeding of paper then stamping to receiving paper everything is controlled by Arduino. The spring accommodates the height adjustment when amount of papers is less. Structure of the setup is made of wood. Motors control the to and fro motion of the stamp mechanism. On this machine different size papers can be stamped continuously and this is the big advantage of this machine over manual stamping by hand.

8 FUTURE SCOPE

Design of stamp magazine and successfully integrate it will be the future scope of this project.

ACKNOWLEDGMENT

Our sincere thanks and gratefulness to Dr. B. K. Mishra (Principal TCET), Dr. S. Siddappa (HOD Mech. Engg. Dept., TCET) and it remains a privilege to thank Mr. R. S. Deshmukh (Prof. Mech. Engg. Dept. TCET) who zealously guided us at every juncture of research and analysis.

REFERENCES

[1] International Journal of Advanced Mechanical Engineering ISSN 2250-3234 Volume 4, Number 5 (2014), pp. 509-517 © Research India Publications

[2] International Journal & Magazine of Engineering, Technology, Management and Research
ISSN No: 2348-4845
Volume No: 2 (2015), Issue No: 7 (July) July 2015

[3] Mahatma Ghandhi Mission College of Engineering & Technology , Nodia, B Tech Project 2015-2016