

# Automatic Stamping Machine

Prof.Amol Parihar<sup>1</sup>, Mr.Shaikh Yunus<sup>2</sup>,Mr.Narsikar Prasad<sup>3</sup>, Mr.Bhagat Sarthak<sup>4</sup>,Didshere Naresh<sup>5</sup>

<sup>1, 2, 3, 4, 5</sup>Dept of Mechanical Engineering

<sup>1, 2, 3, 4, 5</sup>MGM's Polytechnic Aurangabad

**Abstract-** This paper represents the design of a new ladder diagram for the application of a stamping process. The stamping mechanism is controlled by PLC hence it can be implemented in small scale as well as big industries for faster operation and less labor requirement. A physical simulation has been used a rubber stamping kit that comes with a Fatek programmable logic controller. This programming software is been selected because it has its own capabilities and designated symbol.

**Keywords-** Stamping Machine, PLC, Geneva Mechanism etc.

## I. INTRODUCTION

The conventional method for object stamping is manual, it is very time consuming and in non-automatic form. Continuous stamping or printing results in hand fatigue requires lots of efforts and also affects the accuracy to result so the manual method must be replaced by PLC Automation. Automatic stamping of object has received significant attention because automatic stamping is reliable and reproducible. This not only reduce manual effort but also gives more time for marketing also prevent danger which might occur when human being works in hazardous environment. Automation greatly improves the profit and productivity, it is very scalable.

The various modern stamping machining processes getting widely used in the industries are: Pneumatic stamping machine, PLC stamping machine, metal sheet stamping etc. Stamping is process for reproducing text or images using a master form or templates. The process of stamping was manually. It was a human based operation that consist a lot of mistakes and inaccuracy. That operation takes a lot of time and human efforts. Development in stamping machine brings that can print stamp logo on a fixed position on paper. Later development brings movable arm stamp machine. Both machines were only for single pages. This machine contains error while working and also consume time. So we are going to design an automatic stamping machine for multi pages booklet as the Bachelor of Mechanical Engineering project. The important vision of this machine is to fabricate the machine in minimum cost and profitable output. Also the machine is simple to maintain and easy to operate. By using automatic stamping machine it is easy to print the logo, name,

sticker on blank paper, metal and leather. Hence to attempt this needs fabrication of automatic stamping machine is needed. Although paper is the most common material, it is also frequently done on metals, plastics, cloth and composite materials. On paper it is usually carried out as a large-scale industrial process and is a needful part of stamping. Automation can be defined as the “technology concerned with application of mechanical, electronic and computer-based systems to operate and control production”. There are many reasons for automating the process. The reason may be to reduce manufacturing lead time, to increase labour productivity or to improve the worker safety, etc.

## II. PRINCIPLE

The Automatic Stamping Machine is working with Geneva mechanism. The geneva drive is gear mechanism that translate a continuous rotation movement into intermittent rotary motion. In Geneva, rotating drive wheel is usually equipped with a pin that reaches into slot shaped groove located in other wheel that advances it by one step at a time.

## III. LITERATURE SURVEY

D.S. Welkar[1], Automatic and Pad Printing Machining is presented and analysed. In this stamping machine working on principle of Microcontroller. Using this machine we can easily print our logo or name on leather, card board, papers, and plastic articles crafts by using pad printing tool.S. M. Pimpalgaonkar[2], Automatic stamping machine for post card to overcome the usage of manual repetitive stamping work. In works on the principle of utilizing electric energy to mechanical energy by Rack & Pinion mechanism for Post Card. Using this machine for post cards faster work can be done at post office and efficient work can be performed through this machine. Mohd Jazirin Bin Shamsul Bahrin [3] Programmable logic control application for stamping operation. This machine is done by integrating Programmable Logic Control (PLC) with Pneumatic Driven Stamping machine. The rubber stamping machine running smoothly , fast & produce high quality stamping product using PLC with desired process sequence. Mr. Ravipothina,[4] This works on automatic Pneumatic stamping machine with help of transformer, Air compressor, Solenoid switches & Microcontroller. The general purpose of this machine is to

provide automatic pneumatic stamping machine with low power consumption, and effective performance. Yusha Patel,[5], It is an Arduino Controlled Paper Stamping Machine that works on an Arduino controller which controls feed and stamping mechanism of paper. On this machine different size papers can be stamped continuously & very easy to use and also it has smooth operation output. Akshay Gundawar,[6]. The idea behind the project is to create a pneumatic stamping machine at a very low cost. For branding or stamping, logos is needed and identification of product. Create impressions on sheet metals for small thickness. The general purpose of the present invention, which will be described subsequently in greater details, is to provide a portable automatic pneumatic stamping machine. P. R Dadigamuwa,[7] Automated paper gathering and folding machine mainly consists of paper gathering, paper feeding, paper folding, and stamping mechanisms friction feed method was used to make the paper feeding mechanism in proposed machine. This automated machine is portable and capable of working independently without much human intervention also durable and is less of disruptions. Rakesh Sehgal,[8], An attempt has been made to achieve the stamping operation by means of a mechanism which is an inversion of the well known four bar chain mechanism with stamp, stamp pad and the conveyor belt as its limits of travel. It aspect that this paper highlights is how a whole set-up for marking, punching or stamping can be made to operate with a single drive without the need to use a separate drive for the conveyor belt. Ekta Tripathi,[9], A sorting and stamping machine have main task of sorting letters according to the pin codes. This method is highly efficient in sorting printed letters occupies very little space and is a one-time investment that provides invaluable future returns. Pawan Koppa[10]. The idea behind this project is to develop atomize sequence of stamping using PLC in electro pneumatic stamping machine. An automatic stamping machine working on the principle of electro-pneumatics and PLC was successfully designed and developed. Arun S, Sree Rajendra[11]. The press is the punching machine tool designed to punch blank of sheet by applying mechanical force or pressure. The presses are exclusively intended for mass production and they represent the fastest. By using PLC as the controller of the system, good control over the system can be achieved, manufacturing lead time of the system can be reduced. Andrea Dallan[12]. The cutting technologies by punching and stamping will be taken into consideration in these machining due to their similarities. The structure of the production costs and the hourly cost of punching from sheet, punching from coil and stamping with press and die has been analysed. Anuroop Athalye[13]. The price of bought out parts are depends on their cost of manufacturing. If we analyze the scope of cost reduction in bought out parts, then it can improve the overall profit of that product. The paper is based

on cost reduction techniques at supplier end for reduce overall cost of the final product & also contributes to improve in value of the product. Sara Victoria Pérez Vértiz[14]. In this process external robots are use fro reducing the cost and feasibility of machine. There are many robots designed for automatic production in the stamping sector. None has reached the needs to satisfy the efficiency of the industry at an affordable cost. A low cost robot which solves the problem in an efficiency way. Daniel R. Cooper[15]. An Environmental and Cost Analysis of Stamping Sheet Metal Parts The hydraulic punching press process is use in this stamping machine. It concluded that electricity required is less and it is for low to medium size sheets. B.N. Nwankwojike[16]. It includes 4HP single phase electric motor, a crank shaft, crank link mechanism with slider, printing die and tableting blade. This machine which cuts and stamps soap tablets simultaneously, reduced drudgery and risks involved. Ganesh B. Jangale[17]. Design & Development of Automatic Stamping & Pad Printing Machine. It includes printing & embossing process of making text and images using a master form or template. we formulated design calculation for various parts of automatic stamping and pad printing machine. We developed automation unit, so that machine can easily be adopted in today's automated plant. We develop a machine that provides work practically with accuracy of production and performance. A.K.Mrthy[18]. The cutting force is obtained from screw press with rotary motion of flywheel. The high pressure is achieved in this wheel and the crank reduce the fluctuation of pin, so the best output can be achieved. This proposed machine has less lead time when compared to now existing mechanical cutters. Mr. ShindeTushar B[19]. In this process Geneva mechanism is used. Rotary indexing" for stamping and punching machine to over come said errors in conventional machines In this, is try to implement „Geneva wheel machine" which gives higher accuracy. Using this attachment, it will be able stamping one by one simultaneously with certain time delay in between the stamping and punching operation with small angle of twist (0) and equipage. Vijay Kumar[20]. The design and analysis of paper cutting machine using Geneva mechanism. It can be used for positive displacement of the mechanism for different purposes. The main aim of this machine is to reduce timing for paper cutting which was success fully done by project. Rakesh Prajapati[21]. In this Design and Development of Machine to Perform Stamping and Cutting Operation are present. In this crank and lever mechanism, sprockets, roller chain mechanism are used. This machine based on paper cutting but it has some demerits like large in size, costly, need skilled people to operate and it needs electrical input. R. Syam Sudhakar Rao[22]. This machining process include geneva mechanism, punch tool, cam drive and dc motor. 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. Mr. Chetan P. Sable[23]. In this Design and fabrication of paper plate making machining. It works on hydraulic press mechanism with use of hydraulic cylinder. Paper plates can be manufactured at high rate with this machine. S.R. Durai Raju[24]. It includes Geneva mechanism use for various machine process. According to the need of the user, the design and the specification of the Geneva mechanism could be changed and the required sizes of the wheels could be selected. Lubrication is not necessary. The high pressure is achieved in this wheel and the crank reduce the fluctuation of pin, so the best output can be achieved. Aditya Kathar[25]. In this machining process pneumatic control system is used. The general purpose of the present invention, which will be described subsequently in greater details, is to provide a portable automatic pneumatic stamping machine which has many advantages of the low power consumption and effective performance and many specified features of the system, which is not anticipated. further objective of the system is, this is susceptible of a low cost of manufacturing with regards to both cost and labor, and which accordingly is then susceptible of low prices of sale to the public, so thereby making such stamping machine are very economically to available to the public.

#### IV. OBJECTIVES

- To study drawback of traditional system.
- To develop a prototype of the mechanical design.
- To develop microcontroller based system for sensor to detect the object.
- Testing of system and evaluation.

#### V. ADVANTAGES

- 1) Machine work on the low power consumption as compare to the old machine.
- 2) The operation of the new machine is well controlled.
- 3) Well balanced system.
- 4) It approximately matches the efficiency of old machine in low cost application machine.
- 5) Machining time is less depending on operator speed.
- 6) Only simple support structures are required Design & fabrication is easy.
- 7) It is a faster process.
- 8) Initial investment is low.
- 9) More accurate and economical in mass production.
- 10) It minimizes misalignment & Less floor space is required.

11) It increases the safety and working condition.

#### VI. APPLICATIONS

By using this machine we can easily print our logo or name on leather, card board, papers, and plastic articles crafts by using pad printing tool.

#### VII. FUTURE SCOPE

##### 7.1 Automated machine by using programming

The machine developed by us is pneumatically operated. Thus in this machine it is need to give full attention of worker to operate the machine. This machine can be modified to fully automate pneumatic machine by using the pneumatic controls and programming. This automated pneumatic machine can perform any specified printing or embossing work in minimum time, speed and with high accuracy. It can be used to transfer the job from one work station to another using conveyer system. If the path of the operation is given through programming. This machine does not need any regular attention. Line tracker machine is another improvement that can be done for specific work.

##### 7.2 Actual industrial prototype

We developed just a model of the pneumatic printing or embossing machine. In this we have used piston-cylinders and pneumatics with required specifications. But if we want to develop a machine that is to be used in the factory floor, we can use the highly automatic electronics control to increase the efficiency of the printing or embossing system.

##### 7.3 Use

This design can be used at Government offices, Post offices, colleges etc. It can further fabricate with high speed and easy manufacturing with different mechatronics structure.

#### VIII. CONCLUSION

An automatic stamping machine working on mechanical structure of Geneva Mechanism and Simple Crank Mechanism was successfully designed. With the help of Geneva Mechanism we get enough time to stamp on desired position as well as to feed the paper on desired time. Hence we succeed to design a structure which operate in low cost, low time consumption, with maximum accuracy. Hence this design is purely based on ,mechanical structure.

## IX. APPENDIX



## X. ACKNOWLEDGEMENT

We would like to express our gratitude towards guide Prof. Parihar A.A for the useful comments, remarks and for giving his valuable guidance and inspiration throughout the learning process of this report. Further more, We would like to thank our Prof. B. D. Bhalekar (HOD) for making available all the facilities for the successful completion of this work and other staff members of Mechanical Engineering Department for their valuable help. It is with humble gratitude & sense of indebtedness; we thank my respected and esteemed Dr. B. M. Patil (Principal) for his valuable guidance, suggestion and constant support which lead towards successful completion of this work.

## REFERENCES

- [1] Mr. D .S .Welkar, Lalit S.Saundane, Niraj S. Nerker, Harshal R.Baviskar, Vishal P. Sonawane, “AUTOMATIC STAMPING AND PAD PRINTING MACHINE”, 7 th International Conference on Science, Technology and Management , ISBN:978-93-86171-30-6, 2005.
- [2] Mr. S. M. Pimpalgaonkar, Mr. S. V. Kale, Mr. S. G. Ghugal, Mrs. S. V. Borkar, “Automatic Stamping Machine for Post Card to Over Come the Usage of Manual Repetitive Stamping Work”, International Journal For Research In Emerging Science And Technology ,Special Issue ,2007.
- [3] Mohd Jazirin Bin Shamsul , “Programmable logic control application for stamping operation”, University Teknikal Mareshiya Melaka ,2008.
- [4] Mr. Ravipothina,B.Raju, G. Upendra Kumar, “Automatic pneumatic stamping machine” , International Journal & Magazine Of Engineering,Technology,Management And Research ,2008.
- [5] Yusha Patel, Prajakta Atale , Maitri Shah, R. S. Deshmukh, “Arduino controlled automatic paper stamping machine.”, International Journal of Scientific & Engineering Research, Volume 8, Issue 2, ISSN 2229-5518 2009.
- [6] Akshay Gundawar<sup>1</sup>, Yogesh Shahane<sup>2</sup>, Aditya Kathar<sup>3</sup>, Prof. S. A. Shimple<sup>4</sup>, “Pneumatic stamping machine”, Vol-3 Issue-3, IJARIE-ISSN(O)-2395-4396, 2009,
- [7] Thivanka Kasun Gunawardena, P R Dadigamuwa and B G D A Madhusanka, “Low Cost Automated Machine for Paper Gathering and Folding.”, European Journal of Advances in Engineering and Technology, Vol 2(2): 40-43, 2009.
- [8] Rakesh Sehgal & Ashim Sharmab , “A graphical approach for.kinematic design and development of an automatic stamping machine. using four bar chain”, Indian Journal of Engineering & Materials Sciences, Vol. 15, pp. 229-235, June-2009.
- [9] Ekta Tripathi, Pawan Chaudhary, “Material sorting and stamping machine”, International Journal of Current Trends in Engineering & Research (IJCTER), e-ISSN 2455-1392 Volume 3 Issue 5,. 163 – 169 Scientific Journal Impact Factor : 3.468,May 2011.
- [10]Pawan Koppa , Dr.N.Nagaraja, Amith.V, Sushilendra , Vyasaraj T,” “Development and Fabrication of Electro Pneumatic Automatic Stamping Machine.”, International Journal of Innovative Research in Science, Engineering and Technology,Vol. 5, Issue 9, September 2012.
- [11]Arun S, Sree Rajendra and Vijayavithal Bongale. “Automatic Punching Machine: A Low Cost Approach”, International Journal of Advanced Mechanical Engineering, Volume 4, Number 5,ISSN 2250-3234,2012.
- [12]Andrea Dallan, “Comparison between stamping and punching machining.”, LAMIERA, 2012.
- [13]Khurmi and Gupta “Theory of Machine” Edition Reprint 2007. Page no. 106-107 10
- [14]Khurmi and Gupta “Machine Design” Edition 2005. Page no. 261- 280 and 558-57010
- [15]“Information Search Report on an electro-magnetic machines” Om Industries, C- 25, MIDC Satpur.201516 [436]
- [16]Design of machine Elements: - Prof. V. B. Bhandari, Tata Mc .Grew Hill Publishing Co. New Delhi. 5. Workshop Technology, Hajara Chaudhari, MPP e dition 2015.
- [17]Production Technology, R.K. Jain, Khanna publications.17 Edition 2013.