



AUTOMATIC STAMPING AND PAD PRINTING MACHINE

Mr. D .S .Welkar¹ , Lalit S.Saindane² , Niraj S. Nerker³ ,

Harshal R.Baviskar⁴, Vishal P. Sonawane⁵

^{1,2,3,4,5}Mechanical Department, Guru Gobind Singh Polytechnic, Nashik, Maharashtra, (India)

ABSTRACT

Stamping and pad printing Machine is one of the principle machines in stamping industry & printing industry. It is mainly used as the name indicates to stamp the logo or any other symbols. So we are going to make a machine for “SHIVA ENTERPRISES” and make it with minimum cost and for profitable output. The machine is simple to maintain, easy to operate. Hence we tried our hands on “automatic stamping machine.” Automatic stamping machine is working on the principle of microcontroller. 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.

Keywords-Microcontroller, Printing, Logo, Symbols, Stamp.

I.INTRODUCTION

Printing & embossing is a process for reproducing text and images using a master form or template. The earliest examples include Cylinder seals and other objects such as the Cyrus Cylinder and the Cylinders of Nabonidus. The earliest known form of woodblock printing came from China dating to before 220 A.D. Later developments in printing include the movable type, first developed by Bi Sheng in China. Gutenberg introduced mechanical movable type printing to Europe in the 15th century, his printing press key role in the development of the Renaissance, Reformation, the Age of Enlightenment, and the scientific revolution and laid the material basis for the modern knowledge-based economy and the spread of learning to the masses. Modern large-scale printing & embossing is typically done using a printing press, while small-scale printing is done free-form with a digital printer. Though paper is the most common material, it is also frequently done on metals, plastics, cloth and composite materials. On paper it is often carried out as a large-scale industrial process and is an essential part of publishing and transaction printing. Johannes Gutenberg started work on his printing press around 1436, in partnership with Andreas Dritzehen – whom he had previously instructed in gem-cutting – and Andreas Heilmann, the owner of a paper mill.

It is not until a 1439 lawsuit against Gutenberg that an official record exists: witness testimony discussed type, an inventory of metals (including lead) and his type mould. Compared to woodblock printing, movable type page setting and printing using a press was faster and more durable. Also, the metal type pieces were sturdier and the lettering more uniform, leading to typography and fonts. The high quality and relatively low price of the Gutenberg Bible (1455) established the superiority of movable type for Western languages. The printing press rapidly spread across Europe, leading up to the Renaissance, and later all around the world. Page-setting room - c. 1920. Gutenberg's innovations in movable type printing have been called the most important invention of the second millennium. Generally this machine we have made this is cost effective , with less maintainance and gives considerable output. In this machine there are three modes of operation we have added i.e. maual mode , singal auto , continuous auto .With minimum input by using this machine we can achieve maximum profit. This is the main purpose of this machine.



Fig.1. Book printing in the 16th century.

II.NEED OF AUTOMATIC STAMPING & PAD PRINTING MACHINE

2.1 Statement of project

The statement of project is “**Design & fabrication of automatic stamping & pad Printing Machine**” for used **punch or emboss** the machine components names, symbols and other printing work.

2.2 Objective

- 1) To reduce the power consumption during machining.
- 2) To maintain the accuracy in production.
- 3) To develop automation unit, so that m/c can easily be adopted in today's automated plants.
- 4) This type of m/c provides work practically at low cost, low maintenance, low capital investment in less space.
- 5) To perform the most rigid operation with high speed.

2.3 Basic Principle

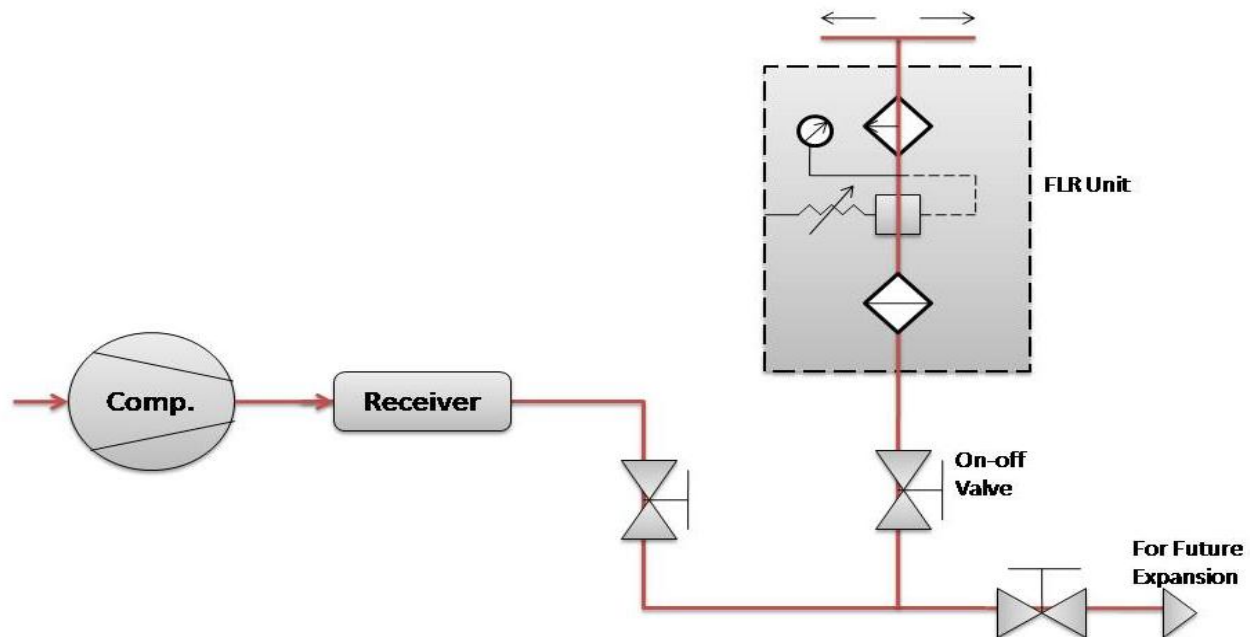


Fig.2. Basic Principle

The basic layout of a pneumatic system is shown in fig.. it could be observed that the basic components involved are similar to a hydraulic system. The basic differences between hydraulic and pneumatic systems are that in hydraulic system the input mechanical energy is imparted to the oil is by pump, whereas, in pneumatic systems the working fluid being air, the mechanical energy is imparted to air by a compressor.

Further, a hydraulic system usually operates at very high pressures to transmit the large force and power while a pneumatic system operates at low pressures of about 5 – 7 bar for industrial applications.

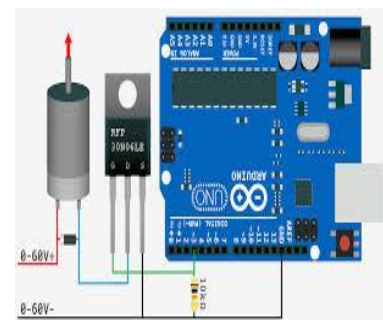
2.4 Problem identification

The stamping is the major operation performed in industry, and to perform this operation in mass number the manpower is require which results in to high cost of production, more time require to complete the operation, affect the accuracy of product so for automation in system we are trying to do a work on new system in stamping.

2.5 Construction

Table.4.1. Components Required

SR. NO.	COMPONENTS	QUANTITY
1.	Double acting cylinder	2
2.	Pneumatic pipe fittings	10
3.	Pneumatic hose pipes	5 Meter
4.	T-fittings	1
5.	Check valve	1
6.	Shaft	2
7.	Washer	10
8.	Nut and Bolt	10
9.	Compressor	1
10.	Compressor valve for tank	1
11.	Solenoid Direction control valve	2
12.	Stamp	1
13.	Stamp pad	1
14.	Electronics control unit & timer	1
15.	Limit switch	4



Double Acting cylinderSolenoid valveTimer with Relay Board



Pneumatic Pipe Fitting ShaftWasher:



Nut and Bolt

III.WORKING



Fig.3. Automatic stamping and pad printing machine

As shown in fig. a frame is supports all pneumatics & embossing tool of a machine. Here we used a compressor for a generation of compressed air. A compressed air is supply to the double acting cylinder by means of hose pipe & 5/2 solenoid Direction control valve automatically using timing device. The embossing tool is provided at end of the pneumatic cylinder rod. When compressed air is supply by the DCV to double acting cylinder due to pressure & force created by compressed air causes embossing action on work pieces. Here the advancement of the header is carried out in the upward and the downward direction using the pneumatic double acting piston and cylinder unit arrangement along with the timer operated solenoid direction control valve. In this type of machine high pressure air is used as the working fluid for the transfer of power, force and the motion to the system.

IV.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.

V. APPLICATIONS

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





VI. FUTURE SCOPE

4.1 Automated machine by using programmig

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.

4.2 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.

VII. CONCLUSION

While concluding this report, we feel quite fulfill in having completed the project assignment well on time, we had enormous practical experience on fulfillment of the manufacturing schedules of the working project model. We are therefore, happy to state that the in calculation of mechanical aptitude proved to be a very useful purpose. Although the design criterious imposed challenging problems which, however were overcome by us due to availability of good reference books. The selection of choice raw materials helped us in machining of the various components to very close tolerance and thereby minimizing the level of balancing problem.

Needless to emphasis here that we had lift no stone unturned in our potential efforts during machining, fabrication and assembly work of the printing or embossing machine project model to our entire satisfaction.

REFERENCES

Book Reference

- [1] Khurmi and Gupta "Theory of Machine" Edition Reprint 2007. Page no. 106-107
- [2] Khurmi and Gupta "Machine Design" Edition 2005. Page no. 261- 280 and 558-570
- [3] "Information Search Report on an electro-magnetic machines" Om Industries, C- 25, MIDC Satpur.201516.



- [4]** Design of machine Elements: - Prof. V. B. Bhandari, Tata Mc .Grew Hill Publishing Co. New Delhi.
- [5]** Workshop Technology, Hajara Chaudhari, MPP edition 2015.
- [6]** Production Technology, R.K. Jain, Khanna publications.17 Edition 2013.
- [7]**PSG Design Data Book of engineers, edition 2012.
- [8]** Pneumatics Systems Principles and Maintenance, Majumdar S.R, Tata McGraw Hill, Edition 2013.