

Automatic Counting System for Small Scale Industries “To Count Manufactured Items (Non-Defective)”

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ABSTRACT: As per the survey, the basic problems that most of the industries face are that they are not exposed to modern technology. According to our survey many industries faced a major problem in counting the cut pieces of the iron stick manually at the end of the day. Our challenge is to develop a device that produces the required number of iron sticks by the consumers. Manually counting the number of pieces during the process might be harmful and time consuming because of the technology developed. Therefore our idea is to develop a machine which can be helpful for many industries in suitable cases: Case1: Considering the raw material, where it is directly cut into pieces. Case2: Considering the raw material which undergoes different processes before it is being cut and comes out as a finished product which needs to be counted.

KEYWORDS: Raw Materials, Iron Sticks.

I. INTRODUCTION

Now a day's Technology is the major problem faced by small scale industries. As small scale industries play a vital role in the economic development of our country. With the latest technology small scale entrepreneurs are not fully exposed. Much resource has to be update or modernise with the obsolete methods of production, as they are confronted with the problems of less production in inferior quality and that too at higher cost. The rival operating modern large scale units they are in no position to compare with better equipped [1]. Considering all the aspect, Purpose is to count and display the no of pieces and to automatically stop the process when required no of pieces are generated.

Traub A25 [2] is a machine that is used in industries which involves 5 different processes. The 5 different process involved are drilling, cutting, chamfering, turning, parting.

Many industries faced a problem in counting the cut pieces of iron sticks manually which consumes a lot of time. So we have taken this project to display the cut pieces of iron sticks which can make their work efficient. Initially the number of cut pieces of iron sticks required by the consumer will be entered. The magnetic sensor which is used detects the 360 degree rotation of the rod through which we can count the cut pieces of iron sticks. The magnetic sensor is used here can detect the nearby magnetic field and has the operating voltage of 3.3 to 5V. It has a digital switching outputs (0 and 1).Once the required number of iron sticks are obtained the machine automatically stops. Once the procedure is completed press the reset button to achieve the requirement of the other consumer.

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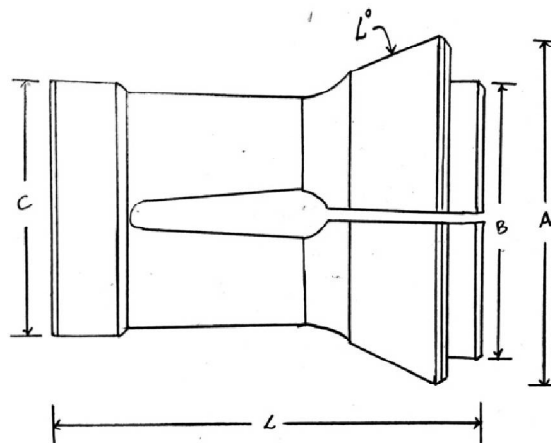


Fig.1 Skeletal model of Traub A25

Fig.1 shows the skeletal model of Traub A25, which is the main domain for implementing this work. As this machine goes 360° rotation for each of the metal piece output, as there will be one possible output of the iron sticks. With this Traub A25 machine there will be no possible of the multiple output at the single instant.



Fig.2 Traub A25 Machine

Fig.2 shows the actual model of the Traub A25 machine, as per mentioned in the Fig.1 which is of skeletal model. This is where the exact implementation takes place.

II. DESIGN IMPLEMENTATION

In the process of counting the cut pieces of iron sticks there are nearly five processes involved. A rod in the machine which rotates 360 degree slowly and continuously indicates generation of single cut piece of iron stick.

An iron rod is inserted in the machine which undergoes five processes to obtain the number of cut pieces of iron sticks. A magnet is attached to the rod which rotates 360 degree, and there is a magnetic sensor detects the magnet which is attached to the rod that completes one cycle.

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The five processes involved in the machine are:

- a) **Chamfering:** It is an edge which is transitional between two vertices of an object. Usually it is more often 45°.
- b) **Drilling:** It is the process of cutting that uses a drill bit to cut a hole of circular cross-section in solid materials.
- c) **Cutting:** It is the process of separation of the physical object, which is of two or more portions, through an acutely directed force.
- d) **Turning:** It is a process of machining in which a cutting tool, describes the helical tool path which moves more or less linearly while the work piece rotates.
- e) **Parting:** is a blade-like cutting tool piece at specified length.

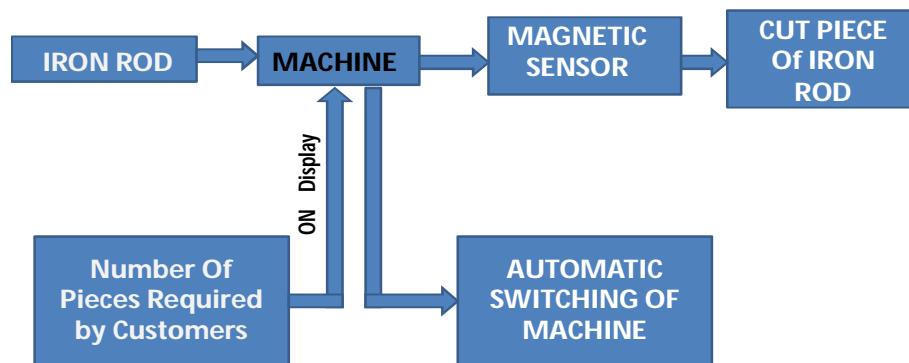


Fig.3 Block Diagram Representation

Fig.3 shows the block diagram representation of the device which we are carrying out, where iron rod as taken as the input and counting display as the output.

The machine is fully operated on cam and the coolant used in the machine is water soluble. There are three motors used in this machine and they are spindle motor, gear motor and coolant motor. Once the required numbers of iron sticks are obtained the machine automatically stops. Once the procedure is completed press the reset button to achieve the requirement of the other consumer. The number of cut pieces of the iron sticks will be displayed on the LCD with the help of microcontroller.

Algorithm:

- Step 1- A rod is inserted in the machine.
- Step 2- Rod undergoes five processes to get the single piece of iron sticks.
- Step 3- A magnet is placed on the rotating rod to detect one complete rotation.
- Step 4- The magnetic sensor senses the 360° rotation of the rod. .
- Step 5- By microcontroller, the cut pieces of iron sticks will be counted.
- Step 6- To start the count from the beginning, switch off and switch on the main button.

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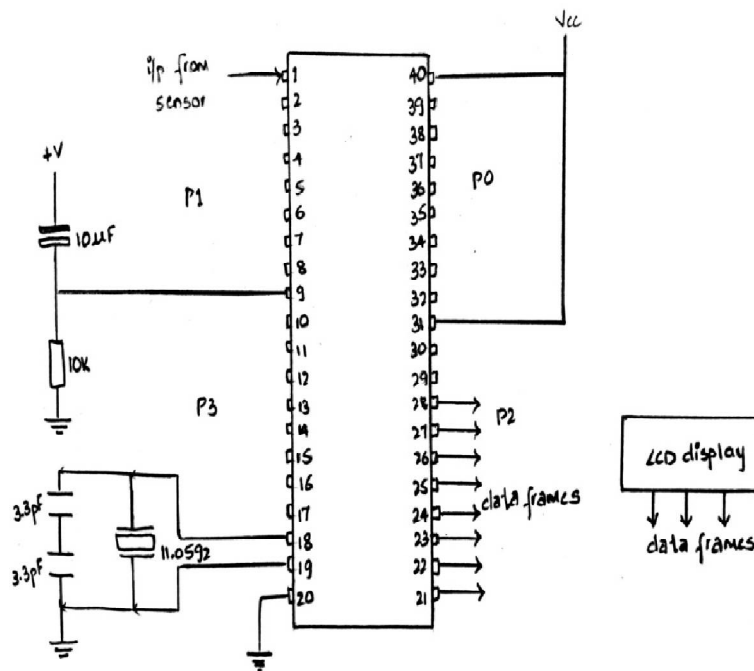


Fig.4 Circuit diagram

As shown in Fig.4, IC AT89S52 consists of 40 pins. These pins have been divided into four sectors for performing different functions. For example: in our project P1 sector is used for inputs from different components, P2 sector is used as output which will be the input for LCD, P3 sector is used for pulse generation for the functioning of IC and P4 sector as Vcc. Crystal oscillator is used for the generation for pulses which ranges between 18th and 19th pin of AT89S52 IC. Ground is connected to pin 20, 21 to 28th pins are given as the input for the LCD which gives the output according to the program dumped in IC and displays the count.

Fig.5 Shows the Printed Circuit Board with the help of table.1 and the components required the working principles of each of the components are:

Magnetic sensor: it is used to count the number of rotation of the magnet which is attached to the iron rod which rotates continuously.

Transformer: it is a type of static device that helps in transforming electrical energy. Here we have used it to transform electrical energy from the main supply to our circuit i.e. to the LCD display and the IC which we have used in our circuit.

LCD display: (LIQUID CRYSTAL DISPLAY) it is used to display the counting of the iron sticks as the rod which rotates continuously completes one full rotation.

AT89S52 IC (microcontroller IC): This is used to dump the program, which is written in keil uvision 3 to count the number of iron sticks as the rod which rotates continuously completes one full 360 degree rotation.

Potentiometer: it is also called as pot. This is used to divide the voltage uniformly throughout the circuit.

Crystal Oscillator: This is used to generate an electrical signal with a given frequency, and to keep the time in track this frequency is being used. This crystal uses the mechanical resonance.

Resistors: These are passive two terminal electrical components which are used to reduce the current in the circuit so that the components do not get damage or they do not get burn.

International Journal of Innovative Research in Science, Engineering and Technology

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Vol. 5, Issue 6, June 2016

Capacitor: These are also the passive two terminal electrical component but these are used to store the electrical energy.

Diode: It is a simple electrical device used to allow the current to flow in only one direction. Thus we can also call it as a switch.

Table.1 List of Components Required

Components	Specification
LCD Display	Operating voltage 1.5V to 6.0V Operating Frequency 30Hz to 200Hz
Magnetic Sensor	MGS1600C
Microcontroller IC	AT89S52
Transformer	
Capacitor	1,000uF, 10uF, 0.1uF
Resistor	1K Ohm
Diode	
Crystal Oscillator	
Potentiometer	

Table.1 gives the list of the required components to obtain the Real time implementation which is shown in Fig.5

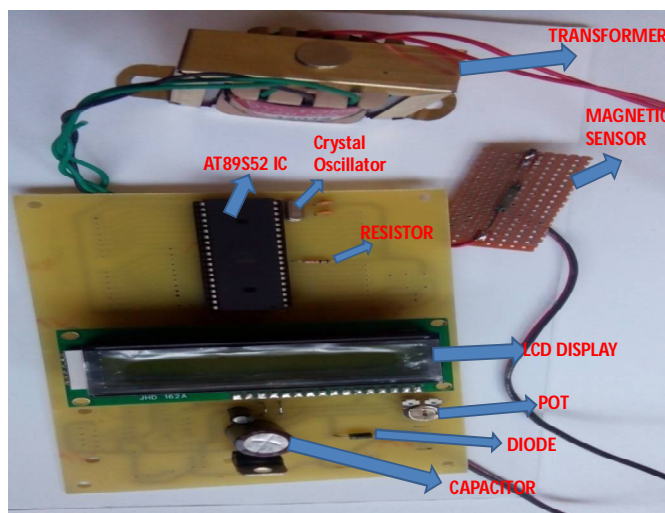


Fig.5 PCB Implementation

Fig.5 shows the PCB implementation of the design, where the magnetic sensor senses the input which is iron rods, as this is interfaced with the LCD, it displays the result of the count.

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III. RESULTS AND DISCUSSION

The magnetic sensor used to detect the iron sticks can detect up to the distance of 4 to 5 centimetre. And the program is written such that it can count up to 10,000 iron sticks. Once the counting of iron sticks is completed the machine stops automatically. “Automatic Counting System for Small Scale Industries “To Count Manufactured Items (Non-Defective)” we can save the power, there will be no labour problem, one can easily handle this and it is very easy to operate. The counting of the iron sticks which is shown in the LCD display in Fig.6.



Fig.6 Breadboard Implementation.

IV. CONCLUSION AND FUTURE SCOPE

From the above discussion and result, this can be used in any other industries where they are facing difficulties in counting in cut pieces manually. Thus we developed a product which counts the cut pieces of iron sticks with the help of microcontroller. This device is able to count 10000 numbers of Iron sticks.

As this project can be developed into the form of Internet of things, where in the aspect of developing the online monitoring the device and the user can set / reset the counter online.

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