



---

# TWIN RING WIRO CUTTER FOR BOOK BINDING INDUSTRIES

M. Shanthi <sup>a\*</sup>, R. Maheswari <sup>b</sup>,

Department of Electronics and Communication Engineering, Agni college of Technology, Chennai 600130  
Tamil nadu India

<sup>a</sup> e-mail: shanthi.ece@act.edu.in, <sup>b</sup> e-mail: maheswari.ece@act.edu.in

## Abstract

The Arduino based twin ring wiro cutter for book binding industries is a simple and elegant machine that can simplify the process of binding the books in small scale industries. This project is a classic example of embedded systems. This project makes use of Arduino board and some other interface devices to automate the process of binding the books. We make use of two stepper motors, motor driver IC(easy driver v4.3), mechanical gear, bearings to accomplish the task. One of the stepper motor is interfaced with the Arduino to pull the wiro from the spool. The second stepper motor is used to periodically move the cutting blade along the vertical axis. The program running on Arduino ensures that there is perfect synchronization between the two stepper motors in order to obtain precise dimensions of the wiro. The stepper motor that is connected to the cutting blade is programmed to rotate 180° in both clockwise and anticlockwise directions. The stepper motor has sufficient torque to precisely and completely cut the wiro segments. This process continues until the fixed count is reached.

**Keywords:** Wiro cutter, book binding, stepper motor

## 1.0 INTRODUCTION

India is a country which has many micro and small scale industries. These industries can't afford to invest money in research and development, innovation. These small scale industries depend on other countries for technological support. As a consequence of this our people are exploited by the foreigners. One such example is the case of book binding industries. They have to depend on countries like America, Germany, china for getting the required tools and machineries. Our project is a small innovation that can reduce the dependency on foreigners by providing the machineries they need.

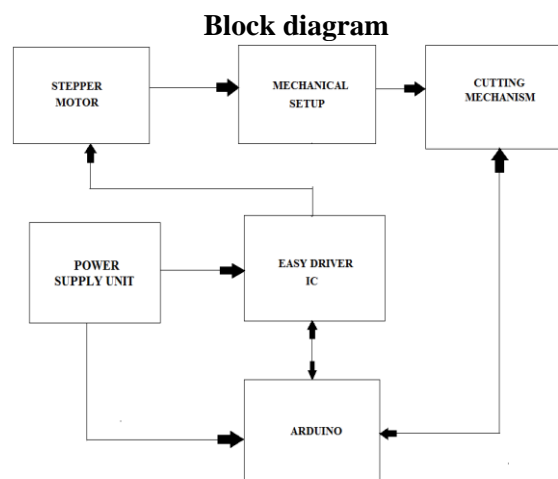
James Burn Wire-O Bind 3500 Semi-Automatic Binding Machine is an existing machine that is used to bind the book semi-automatically. The machine cost is around \$34,455 in US dollars. If machine malfunctions means then it should be serviced only by professional persons. This machine only includes two process out of three. The three process were 1.punching 2. Cutting the required material 3.compressing. From the above process only 2nd and 3rd is given by this machine. Punching the books is done separately by another machine.



## 2.0 Methodology

This is the project that is used by the book binding industry. Many small scale industries cannot afford machines imported from foreign which is above their investment.so, this is a product proposed by us which can automate one of the process in book binding.

This project makes use of Arduino board and some other interface devices to automate the process of binding the books. We make use of two stepper motors , motor driver IC(easy driver v4.3), mechanical gear, bearings to accomplish the task. One of the stepper motor is interfaced with the Arduino to pull the wiro from the spool. The robot has a shape of torpedo with a propeller to allow its motion, sensors to guide it through the path, night vision camera to enable the robot to take pictures of its surroundings clearly even with less light, and GPS system to track its location .The microcontroller used in this project is Raspberry Pi, which is a credit card size computer used in a wide variety of applications .The vehicle design is such that when there is a chance of system failure when it is under water, the vehicle by itself can reach the upper portion of the water surface through which missing of vehicle is completely impossible.



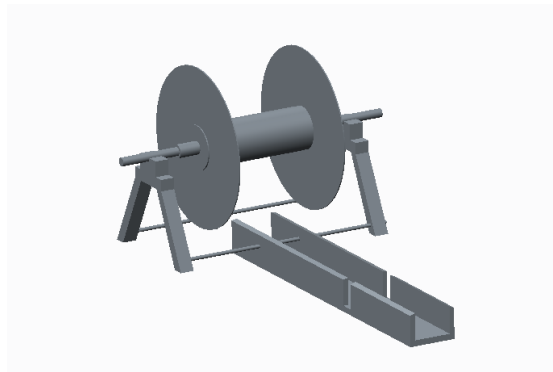
- **Mechanical setup:** The setup is used to place the wiro spool and drag the material.
- **Stepper motor:** It is used drag the material from the mechanical setup
- **Easy driver IC:** It is the stepper motor driver that is used to drive the motor.
- **Arduino mega:** The Arduino Mega 2560 is a microcontroller board based on the ATmega2560 (datasheet). It has 54 digital input/output pins (of which 14 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack,

an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

- **Cutting mechanism:** It is a mechanism that is used to cut the material.

This project makes use of Arduino board and some other interface devices to automate the process of binding the books. We make use of two stepper motors, motor driver IC (easy driver v4.3), mechanical gear, bearings to accomplish the task. One of the stepper motor is interfaced with the Arduino to pull the wire from the spool. The second stepper motor is used to periodically move the cutting blade along the vertical axis. The program running on Arduino ensures that there is perfect synchronization between the two stepper motors in order to obtain precise dimensions of the wire. The stepper motor that is connected to the cutting blade is programmed to rotate 180° in both clockwise and anticlockwise directions. The stepper motor has sufficient torque to precisely and completely cut the wire segments. This process continues until the fixed count is reached.

### Mechanical Design



### 4.0 Conclusion

This machine increases the small scale industries productivity and time taken for it. And also it does Reduction in production time, Increase in accuracy and repeatability, less human error, Less employee costs, Increased safety, Higher volume production.

### References:

- a) <http://jbi-industries.com> for James Burn Wire-O Bind 3500 Semi-Automatic Binding Machine