# Coin based Shoes Polishing Machine

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**Abstract:- The main aim of our project is to design a coin operated shoe polishing machine. As all the office employee want to wear a shoe which is clean. This machine help in reducing the difficulty of existing product available in the market at the same time increase the use of this product in offices, institution etc. The coin operated shoe polishing machines have been designed considering all the requirement and need of users. It has a sensing device which sense the coin depending on that it start working. It is portable and adjustable which makes a person to bring its best feet forward. The problem which arise in the manual operation has been reduced in this machine. Each and every person thinks that their shoes should be clean and shiny. Taking all these into account we have designed this product which reduces the burden of manual operation at the same time increases the use of modern techniques. This project is to provide an apparatus for shining shoes which overcome the problem encountered in the conventional one. It obtain a desired shoe shining effect greater than a manual one.**

*Keywords:- Microcontroller, DC Motor, Coin Accepter, Brushes.*

## I. INTRODUCTION

The coin operated shoe polishing machine is used to polish your shoe within a short interval of time which reduces human strength and effort. The selection of shoe now a days become much difficult all of them want that there shoes should give an attractive look and much better long lasting but forget to follow this steps that needed, therefore reminding all these difficulties we have developed this machine which give your shoes desired look every day with better shine. The introduction of this machine helps in efficient working by combining the cleaning and polishing at one place. It reducehuman efforts. This machine is portable and economical it not only complete the need but also add anew life style for the faculty who regularly uses the shoe. There are so many this types of machine exists but a developed method of making makes the users to use at the same time a wants of the users never ends. Still further modifications can be done in this type.

## II. LITERATURE REVIEW

The design to innovate a shoe-sole cleaning machine is identified as a need for development, through integrating polishing-facility. All the working professionals need to wear cleaned shoes before they enter their facilities to safeguard themselves and also keep the facilities clean. Considering these features the sole-cleaning facility integrated shoe polishing facility has developed by the past researchers. Some of the connected literature to the shoe polishing machine has listed. In the industry perspective the design and development of an automatic shoe polishing machine, which could reduce the difficulties in existing products available in the market and at the same time increase the use of the product in the office . In later years the development of a shoe-sole cleaning integrated with shoe-polishing machine, because of multiple parameters requirement as per customer needs such as compactness and economical features available. The pulse width modulation (PWM) based automatic closed-loop speed control of dc motor. The authors examined about controlling the speed of the dc motor at varying load conditions through the PWM method, using Atmega- 8L microcontroller as a feedback system. It was concluded that constant speed can be maintained at varying load conditions by PWM. In has been reported that a novel Open-loop phase control method is developed by coding a program using ARDUINO software in which the ARDUINO controller takes input from the user and generates firing pulses for the TRIAC which controls the speed of the Induction motor. The total process is executed with the help of an ARDUINO controller kit where ARDUINO and Tera-Term software are used for Micro Controller and serial monitor. This results in variable speed control of Induction motor. The shoe polishing machine by using only a single or specific coin based on a sensor equipment method for polishing the shoe within a short interval of time. In recent years a semi-automatic sole cleaning machine at a low cost. This work has designed and fabricated a sole-cleaner for the shoecleaning process in the easiest way. The duty-cycle variation of the signals results in the change of speed in the motor. Data acquisition (DAQ) obtains ripple current from the motor which is used as a feedback element. A proportional–integral– derivative (PID) control is a universally accepted control algorithm that is widely used in industries. PID controller is LabVIEW is used to control the speed of the required dc motor. At present, the research listed to the shoe-polishing machine's operation through coinbased operation for specific sensor/device methods only presented. The present work targets to design and fabricate the complete automatic shoe-cum-sole polishing machine using the integrated mechanism. Environmental sustainability and energy efficiency factors are key factors for the better utilization of the resources. In this work, we have utilized the Arduino processer, which supports an integrated mechanism to assist the user in the remote mode with the help of Bluetooth connectivity. To achieve higher productivity and quality products at a low cost, the industry should go towards semiautomation or automation. Operations that are repeating in nature should be automated. In steel doors, manufacturing industries' packaging of doors is one of the operations that is mostly done manually. Fuzzy TOPSIS (Technique for Order Preference by Similarities to Ideal Solution) is one of the best methods to get an ideal solution among similar options.

Also it can be used to automate the process and overcome ambiguity, uncertainty in the selection process. This project focuses on the automation of the shoe polishing and shining process without any human involvement in the process . The main purpose of the sensor integrated is to sense and measure the features of the coin kept, like the dimension, weight, magnetic properties, etc. These arranged sensors only operate only when physical contact with the human.

## III. WORKING

Coin operated shoe polishing machine is basically automatic shoes polishing machine. Shoes polish machine consist of two layer of board, the lower board consist of fluid dispensing mechanism and power supply unit. The upper layer consist of shoes polishing and cleaning mechanism. In which consist of the brushes made from nylon material which is categorized the brushes into left hand brush, right hand brush, front side brush. Left hand brush and right hand brush are parallel to each other.  The front brush is placed in the front of the shoes and its face towards the front portion of shoes. The left and right side brushes is attached with sliding mechanism, which is able to provide sliding motion to brushes in forward and reverse motion. The sliding plate scotch yoke mechanism which is able to generate sliding motion in forward and reverse direction.

First we insert the coin  in the coin accepter machine which have operating voltage is 12 + 20%, stand by current 50mA-55mA,operating current 130mA-140mA,peak current is 650mA. The coin accepter will accept  specific coin of 10 Rs which have diameter 21mm-31mm and thickness is 1.2mm-3.0mm.

Now, we will see the dispensing mechanism which consist of 12 v dc water pump, fluid container, fluid dispensing pipe. The 12 v dc water pump is attached with fluid container. The suction head of water pump is submerged into liquid and delivery head is attached with fluid pipe, which is able to deliver fluid with required pressure. The end side of  the pipes is sealed by sealing material for stopping the leakage of fluid.

Then on lcd there will display a message select the button the buttons are for brown and black .We have to select which colour polishing we need then the colour sprinkler will rotate for 1 sec and it will stop rotating then the dc motor will start moving for 10 sec it will move the brushes in the to and for motion then it will display the message polishing is over.

## IV. COMPONENT

- **Controller board:** We are using here a**Arduino Mega 2560** board as the main controller board. It uses IC *ATMEGA2560* as the controller.

We need to program theboard using a software called ARDUINO IDE.



Fig. 1: Controller Board

- **Display:**  we will use a AlphaNumeric display with size of **16x2**, i.e. it ca accommodate 16 characters in a line and it has 2 such lines. Basically the display the information for the user. It will display instruction on it, such as "*Please insert coin*", "*Put your shoes on the place*", "*Please remove your shoes*", etc.



Fig. 2: Display

- **DC motor:** The actual polishing will be done by the polishing brush. The 12v DC motor will give to-and-fro motion to the brush. The brush will be mechanically coupled with the motor. There will be mechanical arrangement which will convert the rotational motion of the DC motor into the translational motion for the brush.



Fig. 3: DC Motor

- **Motor Driver:** The function of the driver IC is to provide sufficient current to the motor. As the DC motors requires a bit high current which cant be provided by the controller board. Hence we have to use driver modules in between the controller board and the DC motor. We will use here a L298 IC driver module which can drive 2 motors at a time and it can provide current upto 2A.
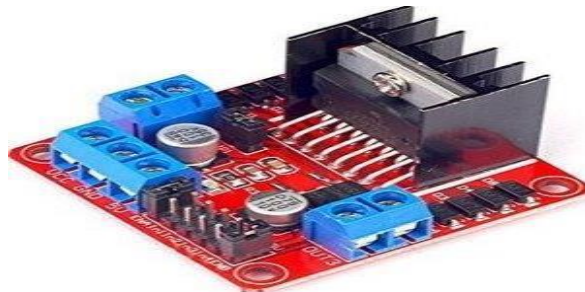


Fig. 4: Motor Driver

- **Selection Switch:** It will be just a manual switch. Using this switch the user can select between the Black colour and Brown colour shoes. The shoe polish liquid will be selected accordingly.



Fig. 5: Selection Switch

- **Multi-Coin acceptor:** Operating Voltage: 12 + 20%, Stand by Current: 50mA-55mA,Operating Current: 310mA-340mA,Peak Current: 650mA.



Fig. 6: Multi-Coin Acceptor

- **Relay Module 2-Channel:**This Relay Module 2-Channel is a module designed to allow you to control two relays in a very simple and intuitive manner. Being compatible with Arduino, the most immediate way to use it is to connect it to an Arduino board using flexible jumpers. Exploiting the characteristics of the relays mounted on the module and through the use of two Arduino digital I/O pins, it is possible to control motors, inductive loads and other devices; this product is therefore fundamental in domastic projects or, more in general, in robotics projects. The module is equipped with optocouplers on IN1 and IN2 lines in such a way that it ensures the galvanic insulation between the relay load and the control board which drives this module.
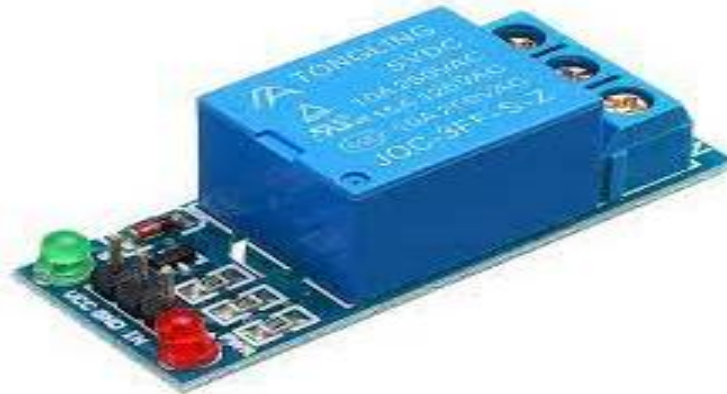


Fig. 7: Relay Module 2-Channel

- **12V DC Water Pump with Brushless Motor DC40-1245:** This product can be used in many fields, such as computer cooling system, Garden fountain, Aquarium, car cooling system, humidifier, air conditioner, and many other cooling and circulation systems.



Fig. 8: 12V DC Water Pump with Brushless Motor DC4

- **L298:** The L298 is an integrated monolithic circuit in a 15- lead Multiwatt and PowerSO20 packages. It is a high voltage, high current dual full-bridge driver designed to accept standard TTL logic levels and drive inductive loads such as relays, solenoids, DC and stepping motors. Two enable inputs are providedto enableor disablethe deviceindependentlyof theinput signals. The emitters of the lower transistors of each bridge are connected togetherand the correspondingexternalterminal can be used for the connectionof.Anadditional supplyinput is provided so that the logic works at a lower voltage.
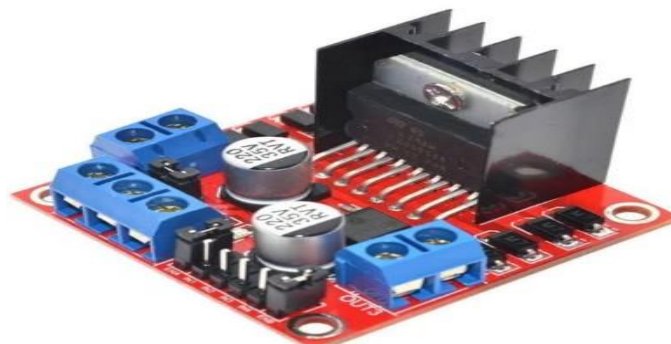


Fig. 9: L298

- **Battery:** The rechargeable batteries are lead-lead dioxide systems. The dilute sulfuric acid electrolyte is absorbed by separators and plates and thus immobilized. Should the battery be accidentally overcharged producing hydrogen and oxygen, special oneway valves allow the gases to escape thus avoiding excessive pressure build-up. Otherwise, the battery is completely sealed and is, therefore, maintenance-free, leak proof and usable in any position.



Fig. 10: Battery

## V. BLOCK DIAGRAM

## VI. FLOW CHART

```
                    ┌──────────┐
                    │  START   │
        ┌───────────┴──────────┴───────────┐
        │       DISPLAY THE MESSAGE         │
   │    └──────────────────────────────────┘
   │                    │
   │              ╱──────────────╲
   │            ╱     COIN         ╲
   │  ┌────┐  ╱     DETECTION        ╲    ┌──────┐
   └──│ NO │◄─╲                     ╱────►│ YES  │
      └────┘    ╲                 ╱       └──────┘
                  ╲──────────────╱
   ⬭BROWN⬭        ┌──────────┐          ⬭BLACK⬭
                  │  SELECT  │
                  └──────────┘
        ◄──           │            ──►
        │             │             │
        ▼             ▼             ▼
   ┌─────────────────────────────────────────┐
   │  START THE MOTOR IN MECHNICAL STRUCTURE  │
   └─────────────────────────────────────────┘
                      │
   ╱──────────╲
 ╱    AFTER     ╲         ┌──────────────────┐
 ╲   SOMETIME   ╱────────►│ POLISHING IS OVER│
   ╲──────────╱           └──────────────────┘
                                   │
                              ┌────────┐
                              │  END   │
                              └────────┘
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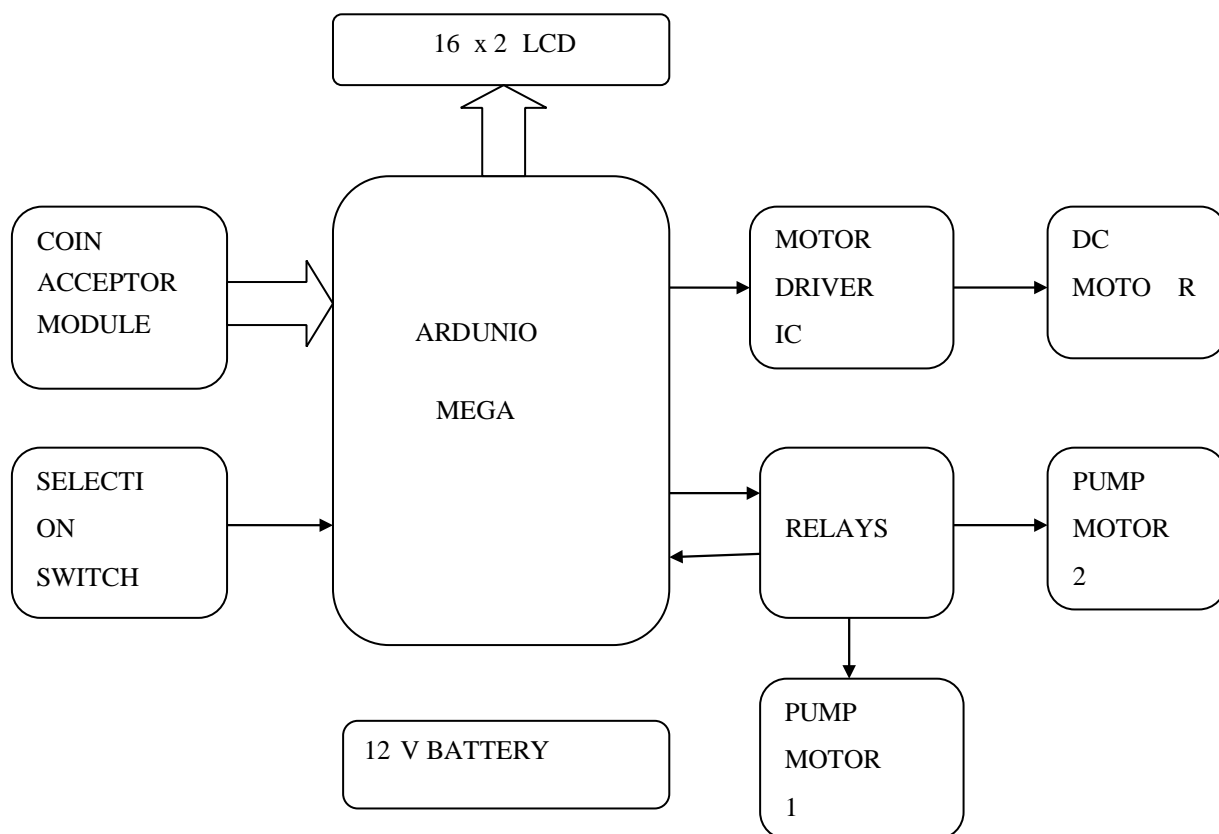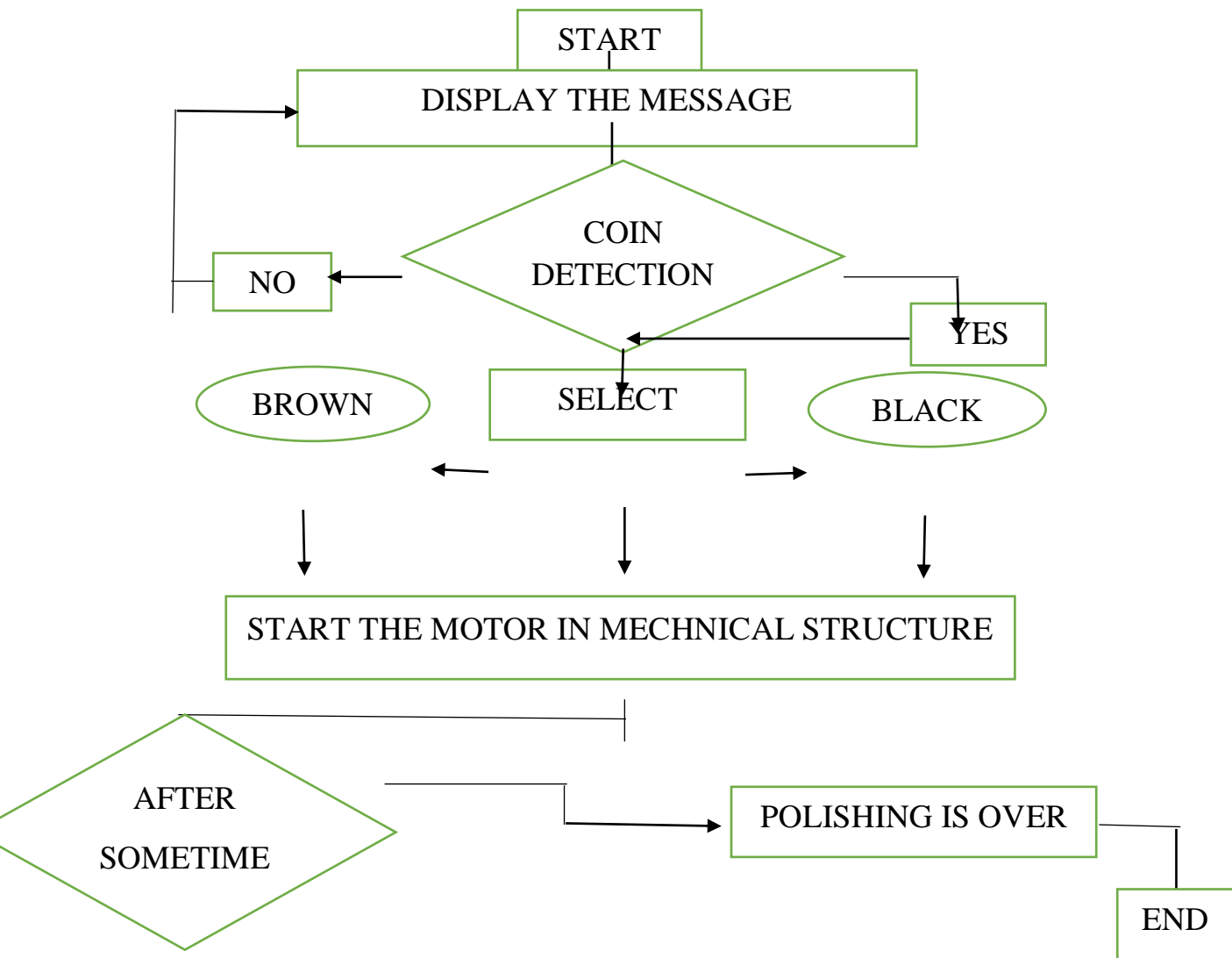
## VII. RESULT

This a prototype project with further improvement it can be used for total polishing of the shoes. It can be used very low power to operate.
- Less efforts
- Less time consuming
- It enables you to clean and shine shoes effortlessly and quicky

## VIII. CONCLUSION

The high speed rotation of the brush help in cleaning the shoe effectively and the rotating brush attached to the same shaft helps in polishing the shoe, where the liquid polish is manually applied to the shoe by the user. Hence the shoe cleaners are extremely useful in places where the dust due to the footwear is a major problem. The shoe cleaning with a polishing machine is a complete set up produced for cleaning the shoe in order to maintain the dust free environment and also polishing the shoe to give the elegant look to the shoe as well as to the user. Thus we can conclude from the above that the usage of shoe cleaning with polishing machine is a must for all the industries and institutions where cleanliness and dust free environment is a primary requirement.

## REFERENCES

[1.] Hughes, R. L. (2010). U.S. Patent No. 7,725,974. Washington, DC: U.S. Patent and Trademark Office.

[2.] Sreenivas, H. T., &amp; Gouda, S. (2013). Design of Shoe Sole Cleaning with Polishing Machine. International Journal of Innovative Research in Science, Engineering and Technology, 2(1), 5022-5029.

[3.] Dewangan, A. K., Chakraborty, N., Shukla, S., &amp; Yadu, V. (2012). PWM based automatic closed-loop speed control of DC motor. International journal of engineering trends and technology, 3(2), 110-112.

[4.] Kumar, R. H., Roopa, A. U., &amp; Sathiya, D. P. (2015). Arduino ATMEGA-328 microcontroller. International journal of innovative research in

electrical, electronics, instrumentation and control engineering, 3(4), 27-29.

[5.]    Kumar, Y. N., Bindu, P. H., Sneha, A. D., &amp; Sravani, A. (2013). A novel implementation of phase control technique for speed control of induction motor using Arduino. International Journal of Emerging Technology and Advanced Engineering, 3(4), 469-473.

[6.]    Srihari, D., Kumar, B. R., &amp; Yuvaraj, K. (2012). Development of Indian Coin based automatic shoe Polishing Machine using Raspberry pi with Open CV. International Journal of Advanced Research in Electrical, Electronics, and Instrumentation Engineering, 1(3). 228- 234.

[7.]    Ramesh, P., &amp; Anish, M. (2019). Design and Fabrication of Semi-Automatic Sole Cleaner. International Research Journal of Multidisciplinary Technovation, 1(4), 9-16.