

Design of an Automatic shoe Polish Machine

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Abstract: -

The propose model is to create an automatic shoe polish machine. Wearing shoes is part of the dress code of every employee in an organization. In today's busy world, wearing clean shoes regularly can take a long time. Automatic shoe polish machine redefines traditional shoe maintenance by integrating comprehensive cleaning and polishing functionalities tailored for leather shoes. Operating across distinct sections: cleaning, waxing, and polishing, it commences with a meticulous cleaning process, initiated by an infrared (IR) sensor upon power supply activation. Following cleaning, a precisely calibrated wax dispenser applies a predetermined amount of wax, before progressing to the final polishing stage, activated by another IR sensor. Emphasizing safety with warnings against leg insertion without shoes and precise sensor detection, our model offers a holistic solution for leather shoe maintenance, overcoming the limitations of existing systems. Aimed at organizational settings where clean shoes are imperative, the machine's mobility, comfort, and efficiency cater to the modern demands of busy professionals, reducing manual effort and enhancing convenience.

Keywords: IR sensor ,8051 microcontroller, DC motor, Relay, Transistor , wax, brushes.

I. INTRODUCTION

The history of shoe polish began before the 1900s with the use of manure, ash and pressure. After the

1900s, it was replaced by different liquid and solid substances. The first shoe polish machine appeared in 1945, but it was very difficult to operate. In this business world, clothing plays an important role in working effectively. Therefore, good shoe polish and shine are more important. Polishing shoes by hand hardens the leather. Not only that, but it also takes a lot of time and staff to scrub. On the other hand, we want to make an automatic shoe polish machine. The main goal of this project is to create a device that can clean and polish shoes with minimal user intervention. The machine will use technologies such as sensors, motors and cleaning equipment to ensure that shoes are not only polished but also treated with care.

MOTIVATION:

The famous saying by our elders "Cleanliness is next to Godliness". Besides, most of the production firms, medical, and educational societies possessing the utmost reserved workrooms such as instrumentation and control, computer-labs, seminar-halls, and common workplaces. Moreover, in the present day scenario production and inventory shops for pharma, and petrochemical, etc., aim to be cleaner and have to be free from dust and dirt which would be carried through the shoe of the employees to the work area, causing untidy



environment and also sometimes hazardous to the working environment. Some of the commercially available machines are available in the present-day market. These machines are completely not enough in satisfying the customized needs like 360° cleaning in all the portions of shoes. Moreover, Furthermore, to satisfy the aesthetic sense for the common people, appearance is quite essential. Considering all these factors into reflection, we have been motivated to develop the novel and innovative shoe polish machine satisfying the professional sense of the design.

II. LITERATURE REVIEW:

Krishna.P3, A.Balakrishna[1], who developed a design that is effective and can polish the surface of the shoe. The machine comes with a double-sided brush that covers all shoes, producing the best shoes compared to existing shoes in the market. This machine can be equipped with an optional coin machine, so it can also be used for business purposes.

Chirag V.R., Denver Martis, Gagan K.N [2] has two wax rollers, two brushes and a bracket that attaches to clamp the shoe securely. Use the clamps to hold the shoes on the bracket, allowing shoes of different sizes to be secured. By pressing the start button on the console, entry will be given to drive the screws.

Intelligent automatic shoe polishing machine design and manufacturing. [3] The user inserts a coin into the coin compartment outside the machine. When the coin passes the infrared sensor, the infrared transmitter emits a signal to the coin, and the signal is reflected to the infrared receiver, the sensor sends the signal to the power board, the power of the body is driven by a strong belt, and a single cleaning brush shaft and shoe shine brush

shaft are connected together by chain drive . As a smart device, it uses Bluetooth to send data.

Development of a Smart Shoe Polishing Machine Using IoT and Machine [4], This paper proposes a smart shoe polishing machine that uses the Internet of Things (IoT) to provide a personalized shoe polishing experience. The machine uses sensors to collect data about the user's shoes, such as the type of shoe, the colour of the shoe, The machine then uses this data to determine the best polishing regimen for the user's shoes. The authors evaluated the machine's performance on a variety of shoes, and found that it was able to achieve a high level of polish.

III. INSTRUCTION :

1. Ensure that the system is intended for use with leather shoes only. Sandals or other types of footwear are not compatible.
2. Do not insert your leg into the system without wearing a shoe. Doing so may result in damage or injury.
3. Place the shoe to be cleaned on the left side of the system and for polishing on right side.
4. After removing the shoe, switch off the power supply to ensure safety and conserve energy.
5. Ensure that the system only polishes the front side of the shoe.
6. Ensure that the brush is kept clean by performing regular maintenance, particularly if it has been in use for more than 8 days. Also refill wax after 8 days.

IV. METHODOLOGY:

The methodology for constructing the automatic shoe polish machine begins with thorough research into shoe sizes, specific types of shoes, and the dimensions required for the system's design. This

initial phase involves analyzing various shoe sizes and styles, particularly focusing on leather footwear, to ensure the machine's compatibility with a diverse range of shoes. Additionally, specific types of shoes, such as loafers, oxfords, or boots, are considered to tailor the machine's mechanisms accordingly, ensuring optimal cleaning and polishing results for each shoe type. Following this analysis, the dimensions of the automatic shoe polish machine are carefully determined to accommodate different shoe sizes while optimizing the efficiency of the system. This includes considerations for the length, width, and height of the machine to provide sufficient space for shoe placement and movement within each of the three sections: cleaning, wax application, and polishing. Through this process, we conclude that the automatic shoe polish machine will be specifically designed for leather shoes, with fixed dimensions and three distinct sections. This decision ensures that the machine can effectively clean and polish leather footwear, providing users with consistent and high-quality results while simplifying the operation and maintenance of the system. Importantly, it is emphasized that the machine is not suitable for other types of shoes or sandals, further reinforcing its specialized design and functionality for leather footwear.

A. WORK FLOW:

The automatic shoe polish system operates in three distinct sections for cleaning and polishing the left and right sides of the shoe. In the initial section, the power supply is switched on, initiating the process. An infrared (IR) sensor positioned to the left of the system detects the presence of the shoe. Upon detection, a motor activates to commence the cleaning process. Once the cleaning is complete, the user can inspect the shoe's left side. If satisfied with the cleanliness, they can proceed to the next

step. However, if the shoe requires further cleaning, the process restarts.

Moving to the second section, the model dispenses two to three drops of wax onto the shoe's surface. This step is crucial for enhancing the shine and durability of the leather. The wax application ensures a uniform and effective polishing process in the subsequent step. In the final section, located on the right side of the system, another IR sensor identifies the presence of the shoe. Upon detection, a separate motor activates to polish the shoe, ensuring a gleaming finish. Once the polishing is complete, the user can remove the shoe from the machine.

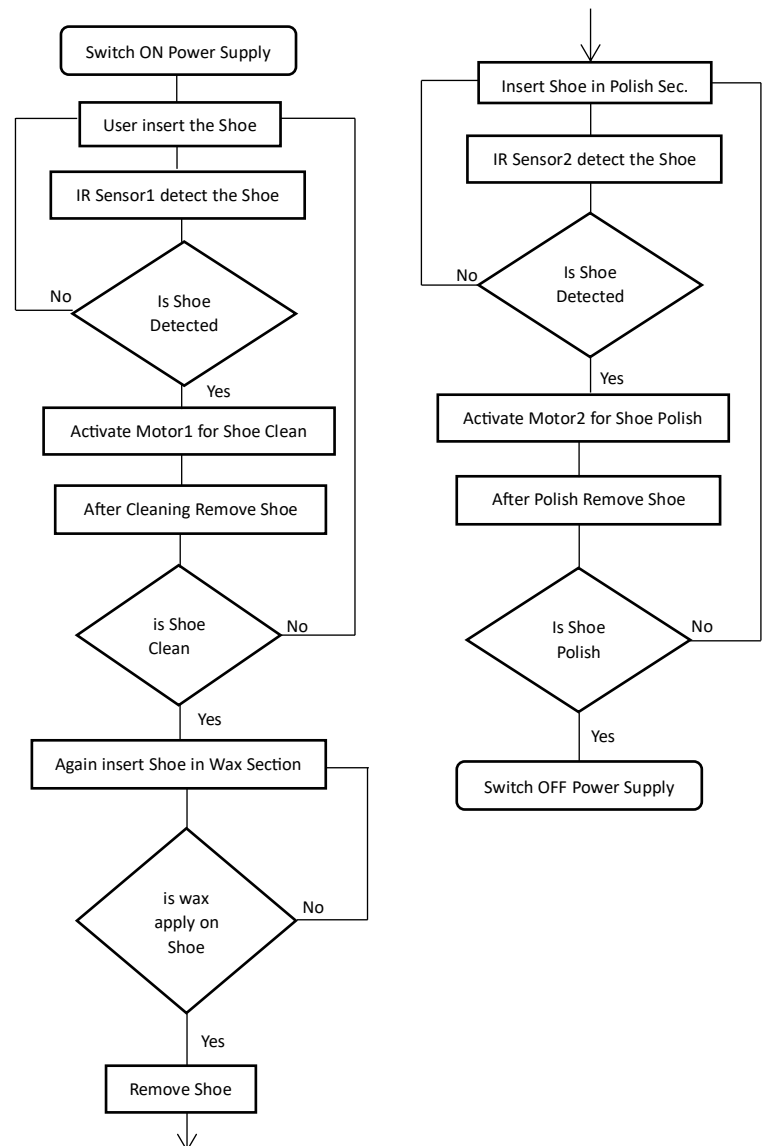


Figure 1.Flow Chart

B. Block Diagram:

The Automatic Shoe Polish Machine employs a comprehensive block diagram that seamlessly integrates key components for efficient shoe care. At the forefront, two infrared (IR) sensors play pivotal roles. The entrance sensor, strategically positioned at the machine's entrance, detects the presence of a shoe when placed in front of it. Simultaneously, a position detection sensor is strategically placed to identify the absence of a shoe after the cleaning process. These sensors act as the input triggers for the subsequent phases of the machine. Two DC motors, each serving distinct purposes, contribute to the functionality of the system. The cleaning motor, activated by the microcontroller upon detection of a shoe, propels the cleaning brushes in shoe direction, ensuring thorough cleaning process. Subsequently, the polishing motor, initiated by the microcontroller after the cleaning phase, is responsible for applying wax to the shoe, enhancing its appearance. Central to the operation, the 8051 microcontroller serves as the brain of the system. It handles signals from both the entrance and position detection sensors, determining the initiation of the cleaning sequence and the readiness for polishing, respectively. The microcontroller also manages the activation and control of the DC motors, ensuring that only one motor operates at any given time. Moreover, it provides users with the flexibility to customize the polishing duration within a specified range, allowing for varied shine levels. Facilitating the interface between the microcontroller and the DC motors, the relay plays a crucial role. It ensures controlled activation of the motors as directed by the microcontroller and regulates the power supplied to optimize the performance of the DC motors. This integrated system operates seamlessly, where the microcontroller orchestrates

the entire process based on sensor inputs. Upon detecting a shoe, it initiates the cleaning phase with the cleaning motor, followed by the polishing phase with the polishing motor. The relay ensures precise control over the motors, contributing to the overall efficiency and user-friendly experience of the automatic shoe polish system .

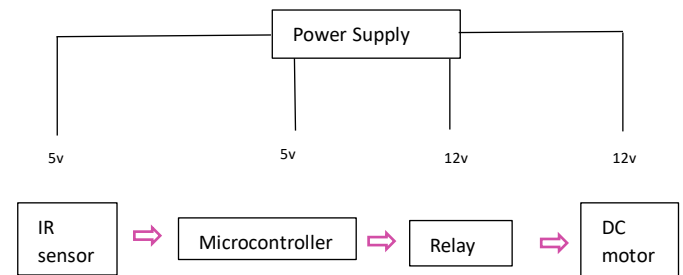


Figure 2. Block Diagram

V . Analysis and Approach

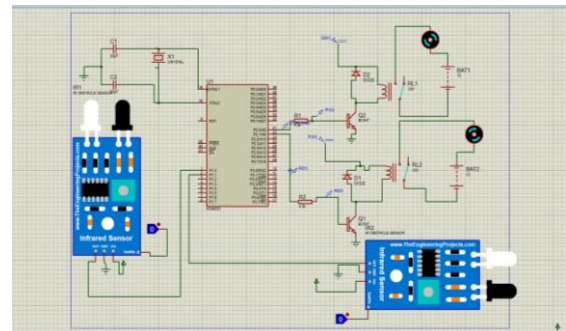


Figure 3. Circuit Diagram of shoe polish

VI. BENEFITS:

1. **Time Efficiency:** Automatic shoe polish machine can clean and polish shoes much faster than manual methods. This is especially beneficial for businesses that need to polish multiple pairs of shoes regularly.
2. **Consistency:** Machine can consistently deliver a high-quality shine on shoes, ensuring a uniform and professional appearance.

3.User-friendly: Most automatic shoe polishing machines are designed with a user interface that is easy to use, even for people with no shoe knowledge.

4.Labor Savings: Businesses can save on labor costs as they no longer need employees dedicated to manual shoe polishing.

5.Time Management: Individuals can save time in their daily routines, as they can quickly polish their shoes while attending to other tasks.

6.Cost Savings: Over time, using an automatic machine can be more cost-effective than constantly purchasing shoe care products and paying for professional shoe polishing services.

VII. CONCLUSION

The main purpose of creating automatic shoe polish is to save time by reducing labor. We have successfully developed an automatic shoe polish machine with zero human power. The quality of the shoes will increase because the machine has one upper brush and two side brushes. This machine

has the ability to simplify and enhance shoes as well as improve the overall appearance and hygiene of shoes. They are particularly suitable for hospitality, institutional and public applications

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