

SANITARY NAPKIN VENDING MACHINE (STREE – SWACHHATA)

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Abstract - This Machine is a fully automatic coin slot, power bank operated machine. During this model coin mechanism is programmed by detection of IR sensor. The unit is additionally supplied with automatic power backup just in case of equipment failure. The unit is supplied with physical inspection window for availability of Napkins. The unit can be wall mounted. The machine contains a storage capacity of fifty Napkins. Our slot machine provides a High solid state Electronic Technology with mechanical advancement. It mainly incorporates single column of horizontal spring which loads the products. The spiral is operated by the low torque, high load DC motor, controlled by the Arduino which is programmed to sense the impulse of the coin when inserted. This mainly constitutes of a really simple mechanism of 'drop and collect'.

Key Words: Sanitary Pad, Sanitary Napkin, Vending Machine, Stree Swachhata, Mechatronics.

1. INTRODUCTION

A coin dispensary is an automatic machine that offers items like snacks, beverages, cigarettes, toys and tickets to customers after money or a coin or a note or special cards are inserted into the machine. The first modern working vending machine was developed in England within the first 1880s and dispensed postcards. Vending machines exist in many countries and places, automatic vending machines that provide fewer common products compared to traditional machine items are created. As technology becomes increasingly important in today's world, it's invaluable to not only learn the due to use technology, but also to understand the due to create it. Since being the engineer, one should have sound knowledge of the opposite discipline. Most of the projects have limited scope to only specific discipline. This might limit one's innovation and creativity. This project inspires to create connections across several disciplines instead of learning topics in isolation because it combines mechanical, electronic, electrical and programming skills.

It's introduced for rural areas.

- It builds towards the attention of the society.
- It brings out innovation and creativity.
- It enhances problem solving skills.

The machine helps to produce a sanitary pad on the insert of a 5/- rupee coin.

A recent report shows that 88% of menstruating women in India are filled with reproductive problems because of their lack of access to sanitary products. About 23% of women drop out of schools and colleges after they menstruate. These reasons throw light to the grave necessity of our project to teach and help the women during this era to fulfill needs.

The area to be visited benefited by this project are :

- Incorporates a simple drop and collect mechanism.
- Incorporates a storage capacity of 25 pads.
- Wall mountable.
- Chargeable battery.
- Cost efficient.

1.1 Problem Statement

As per study in India only 36% of girls use Sanitary Napkins all over India. It's observed that 20 percent of girls didn't use toilet in class during menstruation for fear of staining it, and over 2 out of 5 girls had no idea about menstruation after they started with their periods. Of those who had some idea, only 16 percent received any information in class. There is a possible loss on economic and social front to India; as a result many of the girls are not able to share their menstrual health issues and thus stepping into early marriages and early pregnancies. More girls in schools means universal primary education are not at all educating the girls about periods and what all things we need to take care while period's stage comes. Educated mother should contribute and educate her child of taking precautions using of sanitary napkins. Hence, educating and creating awareness to be used of Sanitary Napkins and furthermore provide quick access to Sanitary Napkins using machine is of prime need. Thus in India some places the ladies uses clothes rather than sanitary napkins the employment of garments may causes health issues. If the girls come to the menstruating age the families are making their child to drop of colleges and getting married, 79 percent of women and girls are not alert to menstrual hygiene practice.

1.2 Objective

The main objective of the sanitary vending machine is to get the hygiene sanitary napkins with reasonable cost and it can be easily fit at any place without any acquiring large amount of space. The napkins should be reachable to all ladies in every place where they are working and going. It is to make a country hygiene and safe free napkins.

- The vending machines were being installed to make sure a good and convenient mode for any time access to the sanitary napkins.
- To supply portable sanitary napkins at economical cost.
- To develop modelling and simulation.
- To design and fabricate a transportable machine using simple techniques.
- To adopt a simple design mechanism, this can be easily maintained.
- The aim is to country safe and hygienic sanitary practices among the ladies.
- To encourage local Entrepreneurs.

- ❖ The MS sheet will hold the spring and sanitary pads.
- ❖ The DC motor of 200rpm is connected to the spring and microcontroller board.
- ❖ The microcontroller board is are connected with IR sensors.
- ❖ The two IR sensors are used one is at coin detection.
- ❖ The second IR sensor is implemented at the sanitary napkin dispensing point.

The works are carried out simultaneously. The source of the power is through rechargeable battery.

2. METHODOLOGY

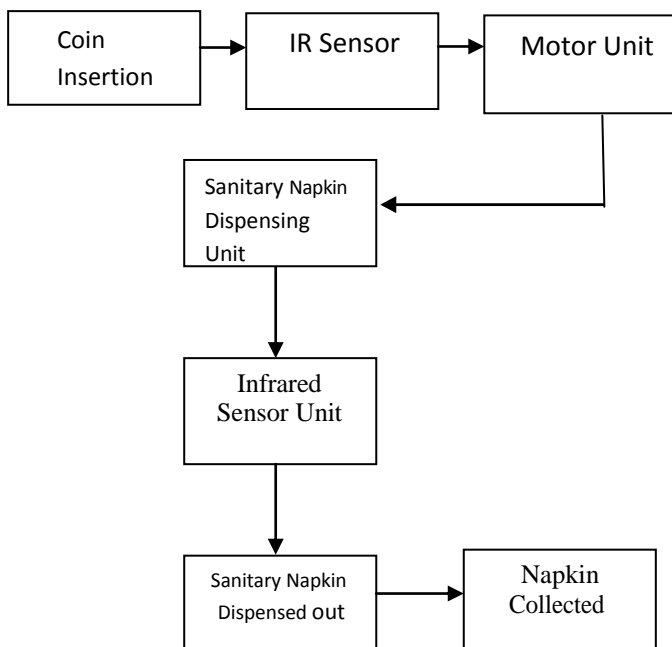
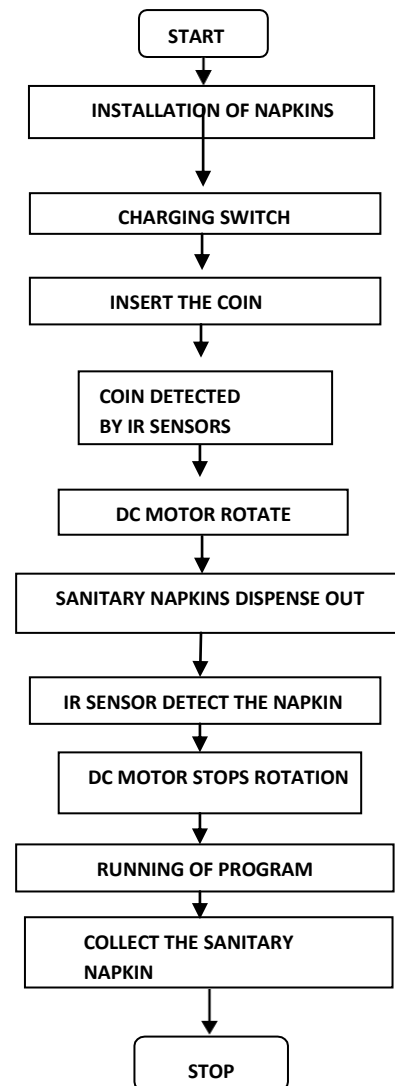


Fig -1: Block diagram of system

Methodology is a systematic analysis of methods to be carried out to design the final product. The well implemented project needs a plan of action and specified steps for its completion. The work of this project started with the coin insertion the coin is inserted in the coin slot then after the IR Sensor will detect the coin and motor unit and sanitary napkin dispensing unit will be activated and motor rotates clockwise sanitary napkin will dispensed out and collected

- ❖ The body / frame of the vending machine is made of Mild Steel.
- ❖ The spring is connected with high powered geared DC motor respectively.

3. OPERATION



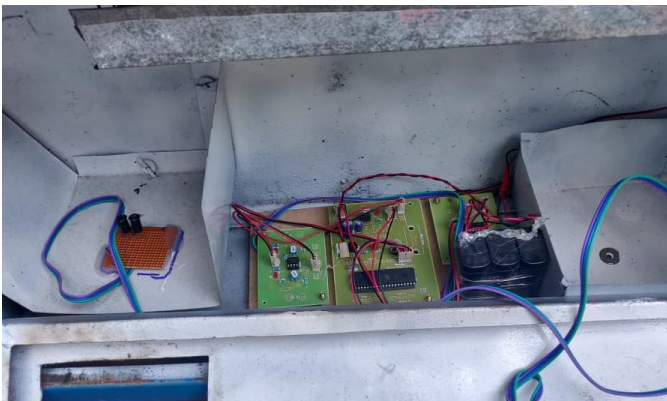


Fig -2: Electronic Components with IR Sensor



Fig -4: Motor and Spring Pad Set Up

3.1. Coin Section:-

The coin insertion unit is provided to the box. A slot is provided at the front portion of the box to insert the coin. This slot will accept only 1 sort of coin. Subsequently the coin is going to be directed through a path way of comparable size. The machine won't accept other denomination coins. The coin would be rejected if we use another coin the IR sensor will detect and reject the coin. The aim of the infrared sensors is to test if the coin is dropped into. Its structure consists of a flat plate to carry the inserted coin. So, when a coin is dropped on the plate, then the infrared signal is cut and immediately an output are going to be generated and thus the sensing are going to be done.

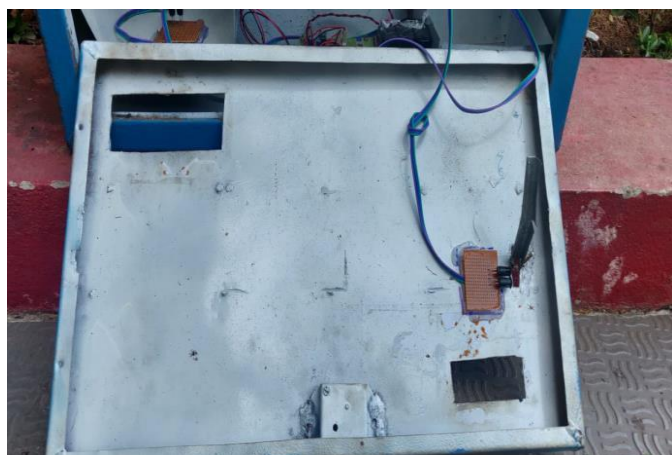


Fig -3: Coin Sensing With IR Sensor

3.2. Motor Rotating Clockwise:-

A DC motor is any of a category of rotary electrical motors that converts DC voltage into energy. The foremost common types rely upon the forces produced by magnetic fields. In this operation the DC geared motor is connected to the spring which helps it rotate and dispense the pad by the IR sensory command.

3.3. Programming:-

The Arduino microcontroller is programmed by the Arduino programming application and so the language used is 'C'. The coin acceptor when on is typically at high and when a legitimate coin is inserted it turn low for 25ms. So, when coin acceptor turns low the microcontroller detects the signal and commands for passing current to IR sensors. The microcontroller is little busy by giving it a counting delay program. Later after certain time the microcontroller signals to prevent passing current to the IR sensors. The IR sensor must be programmed to be open in sure time. The subsequent program is employed to detect the coin-

```
#include Main ()
{
While (1)
{
If (IR1==1) //coin is detected
{
(L293D ON) //Motor ON
If (IR2==1) //obstacle detected
{
(L293D OFF)
}
}
}
Else
{
(L293d OFF)
}
}
```


3.4. Sanitary Pad Sensing Unit:-

An infrared sensor is a device that emits so as to sense some aspects of the environment. An IR sensor can measure the warmth of an object additionally as detects the motion. These styles of sensors measure only actinic radiation, instead of emitting it that's called as a passive IR sensor. Usually within the spectrum, all the objects radiate some type of thermal radiations. These styles of radiations are invisible to our eyes that may be detected by an infrared sensor. So there are two IR sensors placed for the mechanism to work, one for the coin sensing and other at the dispensary.

4. WORKING

The user can drop a coin through the slot provided. After the insertion and sensing of the coin, execution of the method starts. A sensed coin waits for the complete process to be completed before getting deposited into the gathering box. In un-sensed condition ensures that the coin is given back. the method ends with one item being dispensed to the gathering area, the rotation mechanism of the DC motor working motor and also the associated load ensures that proper operation takes place and also the item is vended properly. The pad being dispensed is created to fall on the infra-red sensor. because the object cuts the infrared rays, we will say that the method is complete and rotation of motor stops. If the item isn't dispensed out and if there's no obstruction sensed by the sensor, then it's assumed that there's some problem within the system.



Fig -5: Sanitary Vending Machine (Stree Swachhata)

- The coin is inserted through the slot and the coin is recognised by the IR sensor.
- The infrared sensors are located at two points one is at coin insertion point and another is at the pad dispensing point.
- After the coin insertion the motor rotate clockwise direction and the pad falls on the dispensing point.
- The infrared sensor located at dispensing will recognize the pad and motor stops rotating.

- From the dispensing point the sanitary napkin can be collected.

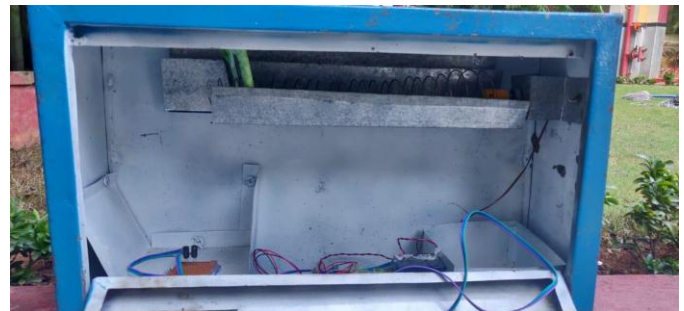


Fig -6: Set Up Overview

5. PARTS OF THE SANITARY VENDING MACHINE

- Mild steel box.
- MS sheet holding spring and napkins.
- DC Motor (200rpm).
- Infrared sensors.
- Sanitary Napkins.
- Mechanical spring.
- Microcontroller.
- Rechargeable battery.

6. ADVANTAGES

- It is easy to install.
- It acquires less space.
- The sanitary napkins are at reasonable cost.
- It can be located in schools, shopping malls, offices etc.
- The napkins are hygiene.
- At a time 50 napkins can be install.
- The battery can be rechargeable.

7. FUTURE SCOPE

- To propose and implement Stree Swachhata sanitary vending machine across the nation for the utilization and education of sanitary vending machine in rural areas .
- To promote and run along a hygienic movement towards women in the society.
- Sanitary vending machine should be installed in every need and all accessible places.

8. CONCLUSIONS

The proposed system is that the design of prototype model for an automatic slot machine. The controller part was tested and it absolutely was found that automatic slot machine prototype was working in keeping with the specifications that it absolutely was designed. The prototype model was

designed for the implementation of the mechanical structure of a slot machine which finally ends up in vending an item upon the insertion of the coin. Implementation of this "STREE SWACHHATA" in schools and colleges will help the scholars to require the things whenever they're in need of it. In future, vending machines of maximum accuracy and efficiency may be achieved with better design and faster control equipment's. Commencing as a "movement of hygiene" within the rural areas, this is often a self-dispensing Sanitary napkin machine which might be easily accessed by all the ladies in rural areas because of the cost efficiency and ease.

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