WATER ATM SYSTEM USING PLC

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Abstract- *This proposed automated water distribution system is used to distribute the required amount of water from ATM machine. We provide ID & PASSWORD to each user then user will enter the required amount of water, So it will help for billing in future. The water from storage tank is measured with the help of level sensor. This system consists of PLC and SCADA. PLC is used to control the distribution of water. SCADA is one of the emerging technologies which are used for complete monitoring. The overall system is connected to PLC with the help of Ethernet cable. PLC gives the signal to the solenoid valve according to the level from water storage tank. What started as a pilot has now gradually begun to gain ground with orders from a number of state governments, pilgrim centres, and public places. "This is not just another business initiative but a social enterprise, whose focus is on creating a viable business model and grooming youth to become entrepreneurs manning these water ATMs, and helping people quench their thirst," says Parag Agarwal, Founder and CMD. Explaining the concept, he says the water ATMs are a combination of appropriate technologies required to treat the water available at different sites. The company's Supremus Aqua Water Treatment System have been used to make the filtration and purification process efficient. Dually operated on solar energy and electricity, they can be remotely maintained and managed. JanaJal has the ability to eliminate the wastage of water during treatment for all river and municipal sources, while for water from bore wells the wastage is limited to around 30 per cent. Each water ATM has an estimated lifespan of 10 years and a capacity to dispense up to 15,000 litres per day. Dispensing drinking water in quantities such as 250 ml and 1 litre at Re 1 per litre on a refill basis, people are encouraged to take away larger quantities for the consumption of their families.*

Keywords- *PLC,IR sensor, Relay, LCD Display, Buzzer, Voice module*

1. INTRODUCTION

With the improvement in the technology there are many advanced devices and machines that are useful to the mankind. One of them is coin operated telephone. As we know the function of it and how it works. With the same technology used we are going to design a project which is based on liquid (water, cold rinks).Coin Operated Water Dispensing System as the name indicates it is based on COIN operation. It has been specially designed for use on Railway Station, Bus deposes, public places etc. This system is based on PLC. The inputs To the PLC are coin and output in the form of water. Looking at the specifications required for Water Dispensing System and for simplicity of our application, PLC was found to be best suited. The use of PLC in any electronic equipment makes it compact and user friendly. We wanted our equipment very handy and cheap. Processor requires less access time for built -in memory and I/O Devices. When we put the coin in coin Box IR catches the coin pulses. PLC switched on relay and motor is on, when put the glass under the valve IR sensor is activate gives output in the form of water. A vending machine is a machine that dispenses items such as snacks, beverages, alcohol, Cigarettes, lottery tickets to customers automatically, after the customer inserts currency or Credit into the machine. The first modern vending machines were developed in England in the early 19th century and dispensed postcards. Vending machine has two functions. These are selling the product and give services to customers. Vending machine will sell the product with different types of products matched with appropriate prices. After paying, the paid product becomes Available by the time the machine releases it at the bottom of the vending machine. For The vending machine that provides services for the main function, the service also may become Available after paying with inserted the payment. Example for the service vending machine is The Automated Teller Machine.
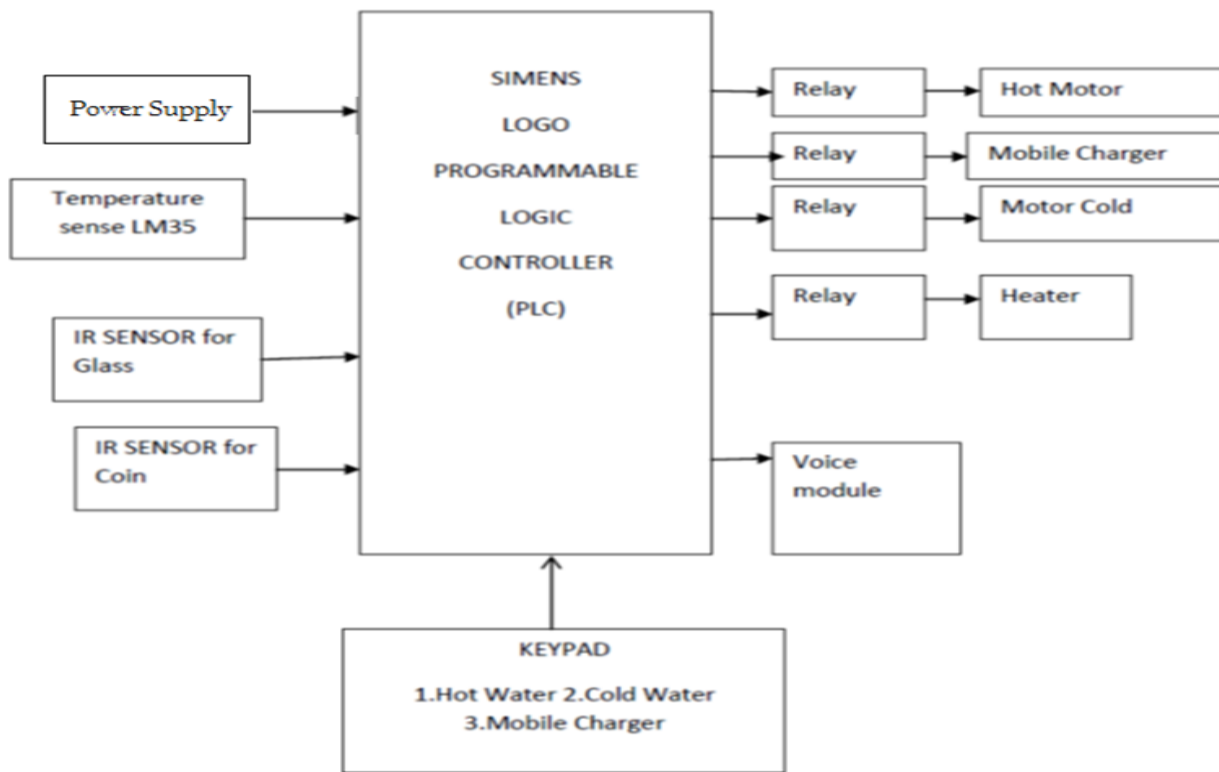
2. PROPOSED SCHEME

Fig.1 Block Diagram

A. Relay

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal. A type of relay that can handle the high power required to directly control an electric motor or other loads is called a contactor. Solid-state relays control power circuits with no moving parts, instead using a semiconductor device to perform switching. Relays with calibrated operating characteristics and sometimes multiple operating coils are used to protect electrical circuits from overload or faults; in modern electric power systems these functions are performed by digital instruments still called "protective relays".

B.SMPS

A switched-mode power supply (switching-mode power supply , SMPS, or switcher) is an electronic power supply that incorporates a switching regulator to convert electrical power efficiently. Like other power supplies, an SMPS transfers power from a source,like mains power, to a load, such as a personal computer, while converting voltage and current characteristics. Unlike a linear power supply, the pass transistor of   a switching-mode supply continually switches between low-dissipation, full-on and full-off states, and spends very little time in the high dissipation transitions, which minimizes wasted energy. Ideally, a switched mode power supply dissipates no power. Voltage regulation is achieved by varying the ratio of on-to-off time. In contrast, a linear power supply regulates the output voltage by continually dissipating power in the pass transistor. This higher power conversion efficiency is an important advantage of a switched-mode power supply. Switched-mode power supplies may also be substantially smaller and lighter than a linear supply due to the smaller transformer size and weight. Switching regulators are used as replacements for linear regulators when higher efficiency, smaller size or lighter weights are required. They are, however, more complicated; their switching currents can cause electrical noise problems if not carefully suppressed, and simple designs may have a poor power factor very little time in the high dissipation transitions, which minimizes wasted energy. Ideally, a switched mode power supply dissipates no power. Voltage regulation is achieved.

C. PANEL LED LIGHTING

The Light Emitting Diodes are great for projects because they provide visual entertainment. LEDs use a special material which emits light when current flows through it. Unlike light bulbs, LEDs never burn out unless their current limit is passed. A current of 0.02Amps (20 mA) to 0.04 Amps (40 mA) is a good range for LEDs. They have a positive leg and a negative leg just like regular diodes. To find the positive side of an LED, look for a line in the metal inside the LED. It may be difficult to see the line. This line is closest to the positive side of the LED. Another way of finding the positive side is to find a flat spot on the edge of the LED. This flat spot is on the negative side. When current is flowing through an LED the voltage on the positive leg is about 1.4volts higher than the voltage on the negative side. Remember that there is no resistance to limit the current so a resistor must be used in series with the LED to avoid destroying it. It has high brightness panel led indicators light in various colors like red, green, yellow, blue, white. Various volt range in led indicators lights. Long life working. Different Volt is available 24v,110v, 220v.This difference in temperature across the thermocouple junction causes the detector to generate a positive voltage. If the active or „hot" junction were to cool to a temperature less than the reference or „cold" junction the voltage output would be negative. The output of the thermopile detector is presented to a gain selectable amplifier. The GAIN switch located on the top of the sensor is used to adjust the output of the sensor to a level appropriate for the experiment being performed. Gain settings of 1X, 10X and 100X are provided The second factor involved time, expenses and labour required when a change of control needs to be done by modifying the control panel itself. In 1968 GM Hydromantic (the automatic transmission division of General Motors) issued a request for proposal for an electronic replacement for hard-wired relay systems. The winning proposal came from Bedford Associates that designated the 084 product called Modicom, which stood for Modular Digital Controller. One of the people who worked on that project was Dick Morley, who is considered to be the "father" of the PLC. The unit was retired after nearly twenty years of uninterrupted service. According to Jansen (1996) PLCs are used in many different industries and achiness such as packaging and semiconductor machines.

D. IR SENSOR-

An infrared sensoris an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion .These types of sensors measures only infrared radiation, rather than emitting it that is called as a passive IR sensor. Usually in the infrared spectrum, all the objects radiate some form of thermal radiations. These types of radiations are invisible to our eyes, that can be detected by an infrared sensor. The emitter is simply an IR LED Light Emitting Diode and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, The resistances and these output voltages, change in proportion to the magnitude of the IR light received. This sensor is analogous to human"s visionary senses, which can be used to detect obstacles and it is one of the common applications in real time.This circuit comprises of the following components. We have already discussed how a light sensor works. IR Sensors work by using a specific light sensor to detect a select light wavelength in the Infra-Red (IR) spectrum. By using an LED which produces light at the same wavelength as what the sensor is looking for, you can look at the intensity of the received light. When an object is close to the sensor, the light from the LED bounces off the object and into the light sensor. This results in a large jump in the intensity, which we already know can be detected using a threshold. Infrared sensors can be passive or active. Passive infrared sensors are basically Infrared detectors. Passive infrared sensors do not use any infrared source and detects energy emitted by obstacles in the field of view. They are of two types: quantum and thermal. Thermal infrared sensors use infrared energy as the source of heat and are independent of wavelength.

E.Voice Module

Offers true solid state storage capability and requires no software or microcontroller support. It provides high quality recording and playback with **40 seconds** audio at 12 Khz Sampling rate with 16 bit resolution. Using on board jumpers, total duration can be divided in individual triggers of 1, 2 & 4 segments which can be triggered by onboard switches or external low trigger like microcontroller pins.

3. SYSTEM WORKING

If the coin is detected then water will be disposed in the glass if glass is not present then buzzer will be turned off using plc. if system detect coin it will also turn on the mobile charge to charge the system using timer and system will also detect the presence of glass to avoid the wastage of the water. Uses infrared beam reaction for detecting proximity of objects Proximity Sensor are used to detect objects and obstacles in front of sensor. Sensor keeps transmitting modulated

infrared Light and when any object comes near, it is detected by the sensor by monitoring the reacted light from the object. It can be used in robots for obstacle avoidance, for automatic doors, for parking aid devices or for security alarm systems, or contact less tachometer by measuring RPM of rotation objects like fan blades. Digital low output on detecting objects in front. Buzzer is electromechanical, piezoelectronics device which is generally used for alarm application for user. In day to day life importance of water is necessary therefore we have to save it, in our project we use one buzzer circuit whose application sometimes the pipeline of city water distribution may leak at that situation sensor sense the leakage and send signal to the buzzer circuit and buzzer will beep continuously.
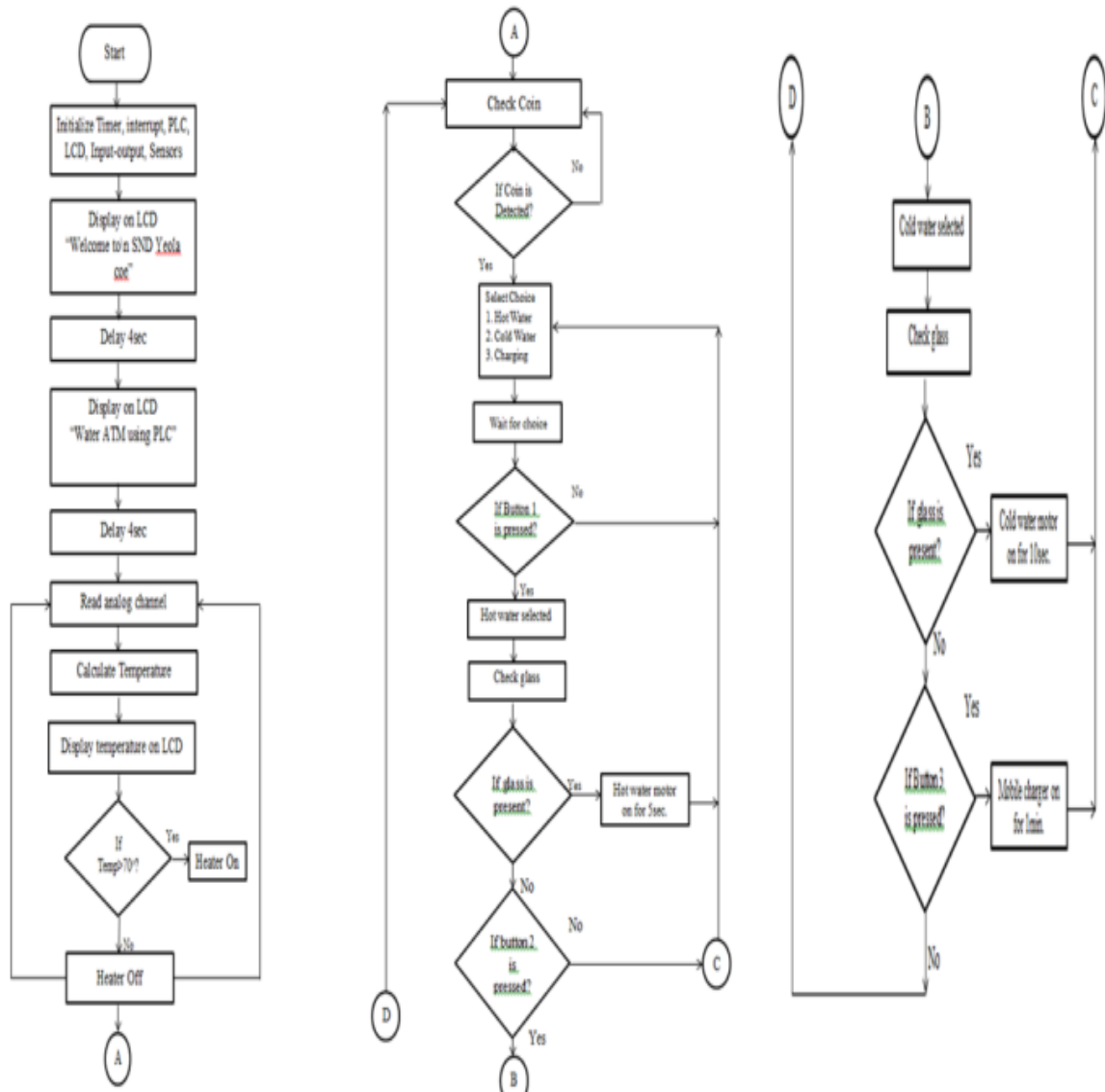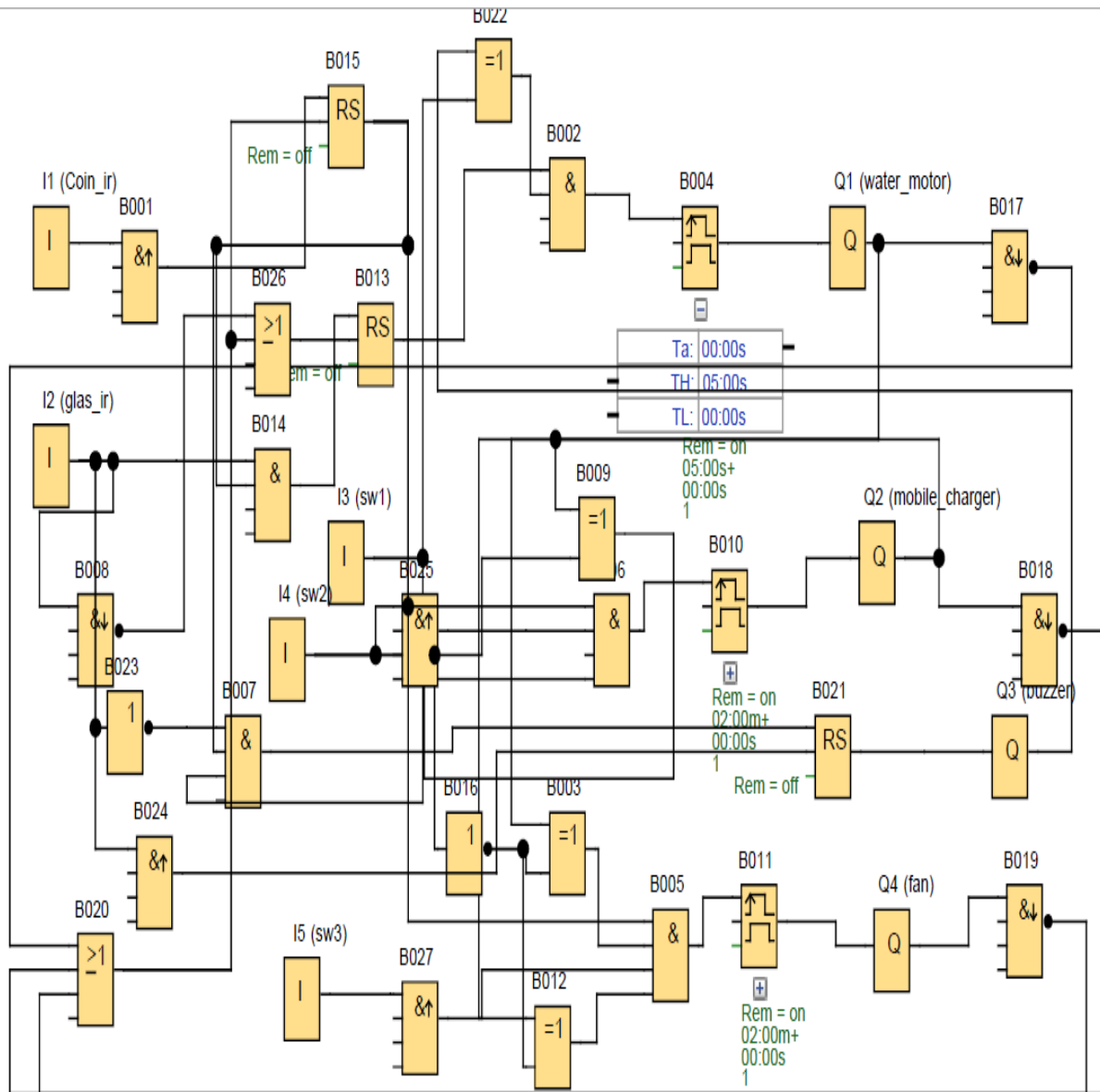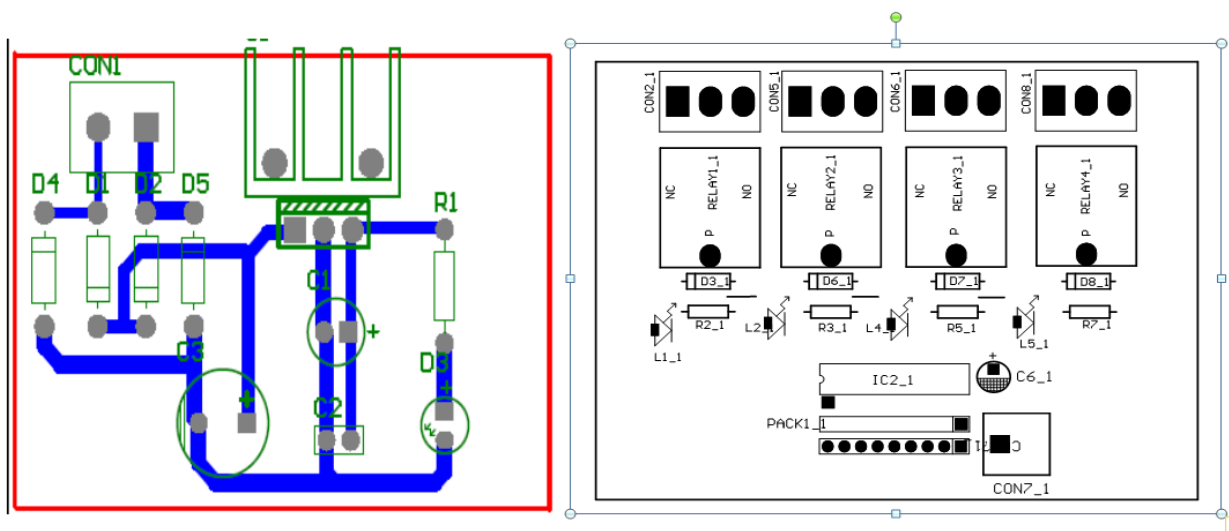

Fig.2   Flowchart

Fig.3   Ladder Diagram

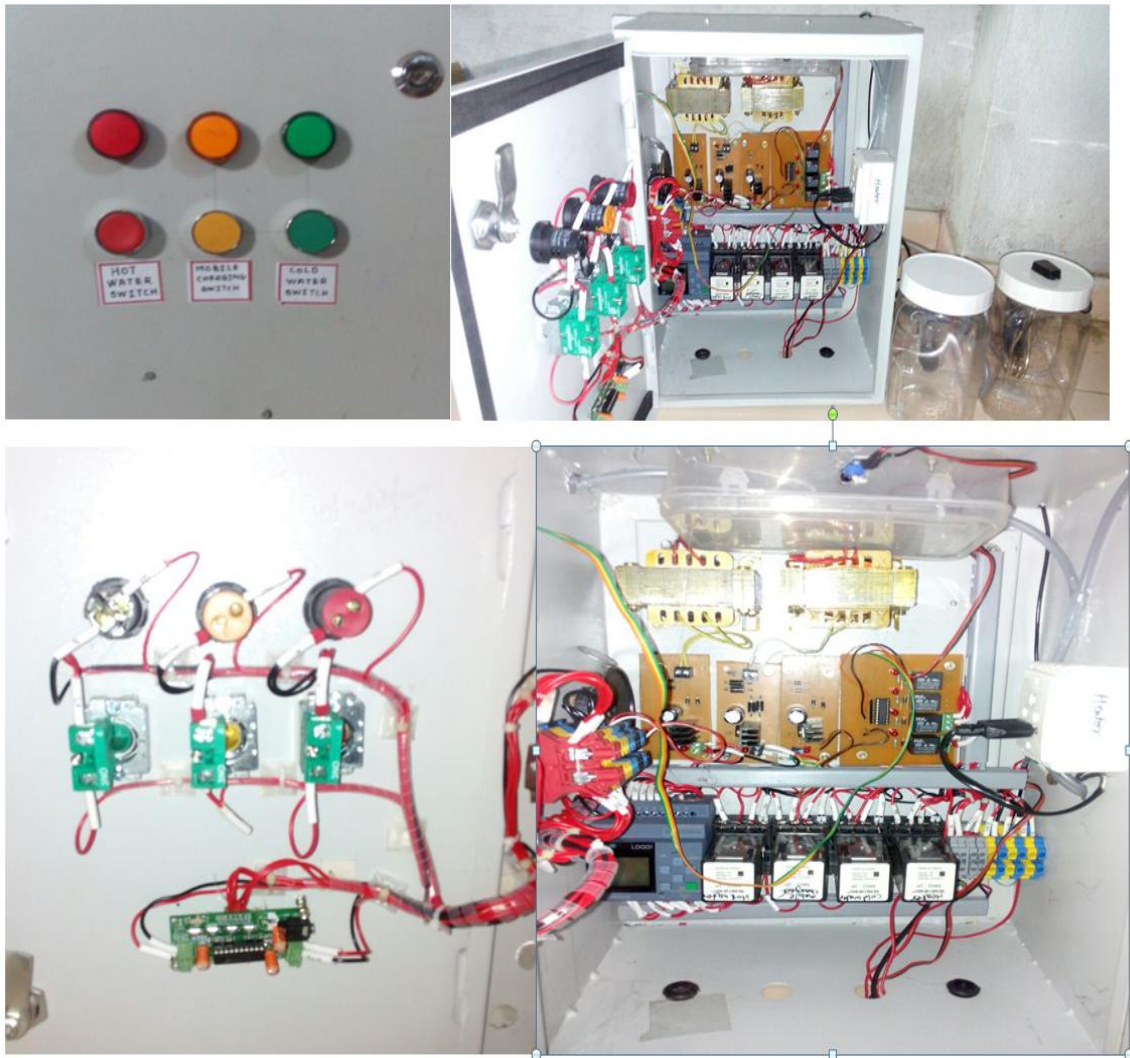**Fig.4 Layout of Power Supply & Relay Board**

Fig.5 Actual Design of Model with Circuit

4. SYSTEM SCOPE

A. Advantages:-
- The main advantage of the switching power supply is greater efficiency because the switching transistor dissipates little power when acting as a switch.
- Other advantages include smaller size and lighter weight from the elimination of heavy line-frequency transformers, and lower heat generation due to higher efficiency.
- It reduce the water scarcity problem in the city
- Concept of buying water will also ensure that people use water judiciously and do not waste it.

B. Limitations:-
- Influenced One of the shortfalls is that this technology gives no provision for bargaining and therefore fixed prices apply and this may be unfriendly both to the customer and the owner.

C. Applications :-
- On The Vending Machine can be used for other fluids i.e. beverages and juices.
- Can be used in small shops as an additional income to the shopkeeper.

5. CONCLUSION

Finally Our aim is to deliver water all the time. Our Automated Plants will simplify complex operations and automatically control regular operation cycles for quality, without any dependency. Reduce maintenance and service costs of the plants without compromising the quality of water. The model described in this project provides a methodology that will help the person to easily fetch the water from the system.

This model utilizes a holistic approach that overcomes many of the shortcomings of previously developed models and standards while building on the significant contributions previously made. And system will also useful for charging to the mobile

6. FUTURE SCOPE

Our Water ATM can be placed anywhere in cities, villages, colleges, hospitals, railway Station & public places to provide purified drinking water. This system is also very useful at spiritual places, slum areas. To avoid pollution from plastic Water Bottles one of the problems with bottled water. The bottle that the water comes in these bottles can cause major problems in the Environment and for the person drinking from them. Along with water this system used to provide Tea and Coffee.

We recognized that its operations were less efficient than industry standards and were faced with the challenge that industry „best practice" approaches may not be suitable for the company's small-scale franchises. The purpose of this master's project was therefore to generate creative new approaches to improving Our system water-use efficiency. we will try expressed specific interest in strategies and applications for utilizing purifiers , which not only mitigate negative environmental impacts of their operations, but also provide economically and socially beneficial.

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