Coin Operated Universal Mobile Charging with Solar Tracking

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Abstract— Coin operated universal mobile charging with solar tracking is described in this paper which provides service in public areas. In rural area partial grid power is available in a day, to overcome this solar charging is a suitable method. This technique can be used in business areas, in railway station, in bus stand, in market. The basic design of this system is to provide uninterrupted communication to the user if he forgets to charge his battery or if the battery becomes flat. Charging of mobile can be accomplished by single coin insertion. Microcontroller is used for detection of inserted coin using IR sensor and controlling the charging period for specific time. User can continue the charging by inserting more coin.

Keywords: Microcontroller, Solar panel, LCD, LDR, Solenoid, grid power, IR sensor

I. INTRODUCTION

In recent years use of mobile phones is more and it is a need to charge mobile anytime and at any place. In some places grid power is not sufficient so a natural source of energy is used for charging mobile. Many times battery [3] becomes flat in the middle of conversation or the charging ends particularly at inconvenient times when access to a standard charger isn't possible. The coin operated mobile battery charger is designed to solve this problem. The user has to plug the mobile phone into one of the adapters and insert a coin; the phone will then be given a micro-pulse for charging.

The mobile battery starts charging when coin inserted in coin mechanism. User plugs the charger and user selects the require option of charging. When user press OK it coin is accepted by the solenoid mechanism and gets collected in the collection box, if user select the option CANCEL by coin is rejected and returned to the user. NEXT key is provided for selecting a particular charger.

Various mobile options are provided by the microcontroller .User has to select any one of the option. When the mobile battery is connected, it displays" Insert Coin". While charging it displays "Charging" and at the end of charging cycle it displays "Charge completed".

The mechanical movement of the solar panel is controlled through the stepper motor. 2 LDR's are used.. So according to the sun movement LDR intensity will be varied, where the sun light intensity is more LDR intensity will be less and depending upon LDR intensities stepper motor will be rotated to the side where the LDR intensity is found to be less so that solar panel is also rotates. If LDR1 intensity is less it Switch to LDR2 and stepper motor rotate the panel from LDR1 position to LDR2. Controller controls the stepper motor through driver IC.

Once controller receives the pulse from the key it will charge the mobile for some specific time which is already fed in through programming.

II. BLOCK DIAGRAM
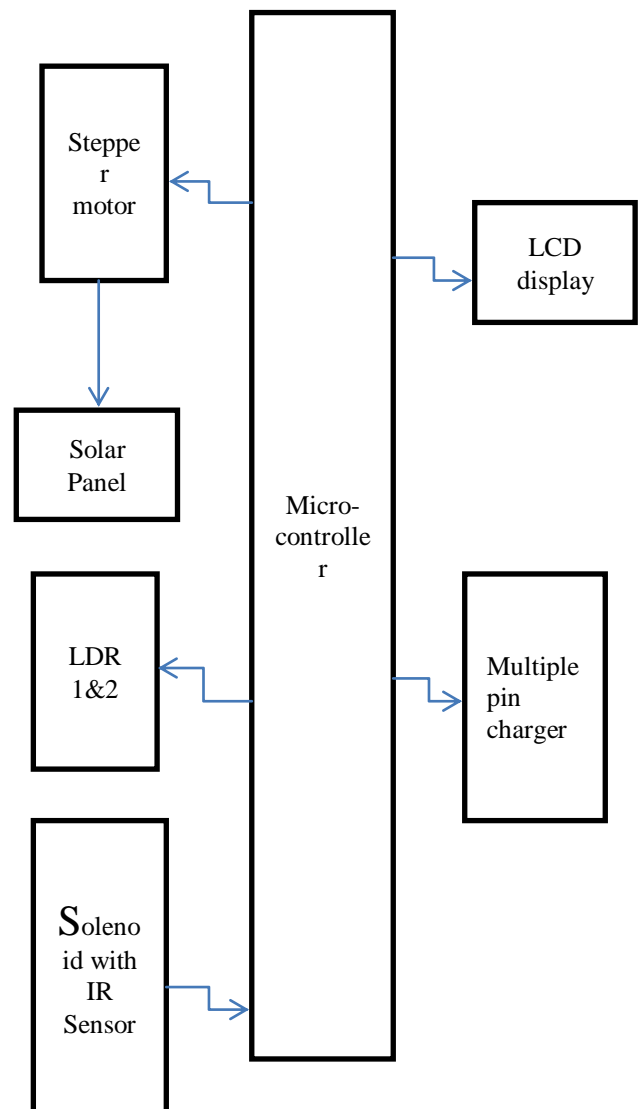
1) Solenoid with IR sensor:

IR sensor will check whether the coin is fair or not and then the digital output of the IR sensor will be given to the microcontroller.For that two IR sensors one act as transmitter and other as a receiver is required.

If the coin is fair microcontroller will send electric pulse to the solenoid which converts electrical energy to mechanical motion which accepts the coin in the collection box. If the coin is not fair it gets back to the refund box.It acts as a transducer.

2) LDR 1 & 2:

It is a Light Dependent Resistor. Depending upon the intensity of sunlight it will rotate the solar panel accordingly. Controller sense the output of LDR & difference between two LDR intensity.LDR interfaces with controller through the LM339 comparator IC.

3) Stepper Motor:

It is interfaced with controller through ULN driver IC 2003.The rotation of stepper motor is controlled through programming. It rotates solar panel 90^0clockwise and 90^0 anticlockwise directions.

4) LCD Display:

Before inserting a coin it displays a message 'Please Insert a coin'. Once the coin is accepted then it displays a message to 'Select Mobile'. After selection of charger it starts the timer which is set through controller. Once the charging is completed it displays message 'Charging Complete'.

5) Solar Panel:

Solar panel of 18v is used to gives the output of 1.2mA.It connects with battery through voltage regulator IC. Voltage regulator IC gives a fixed voltage to output. These output voltages adjust using potentiometer .Constant output voltage use to charge the battery.

6) Relay Circuit:

It is interfaced with controller through driver IC ULN2003It is used to switch the solar power supply to grid power supply. Switching the power supply 8 pin relay is used.After selection of mobile relay switch to charge selective mobile.
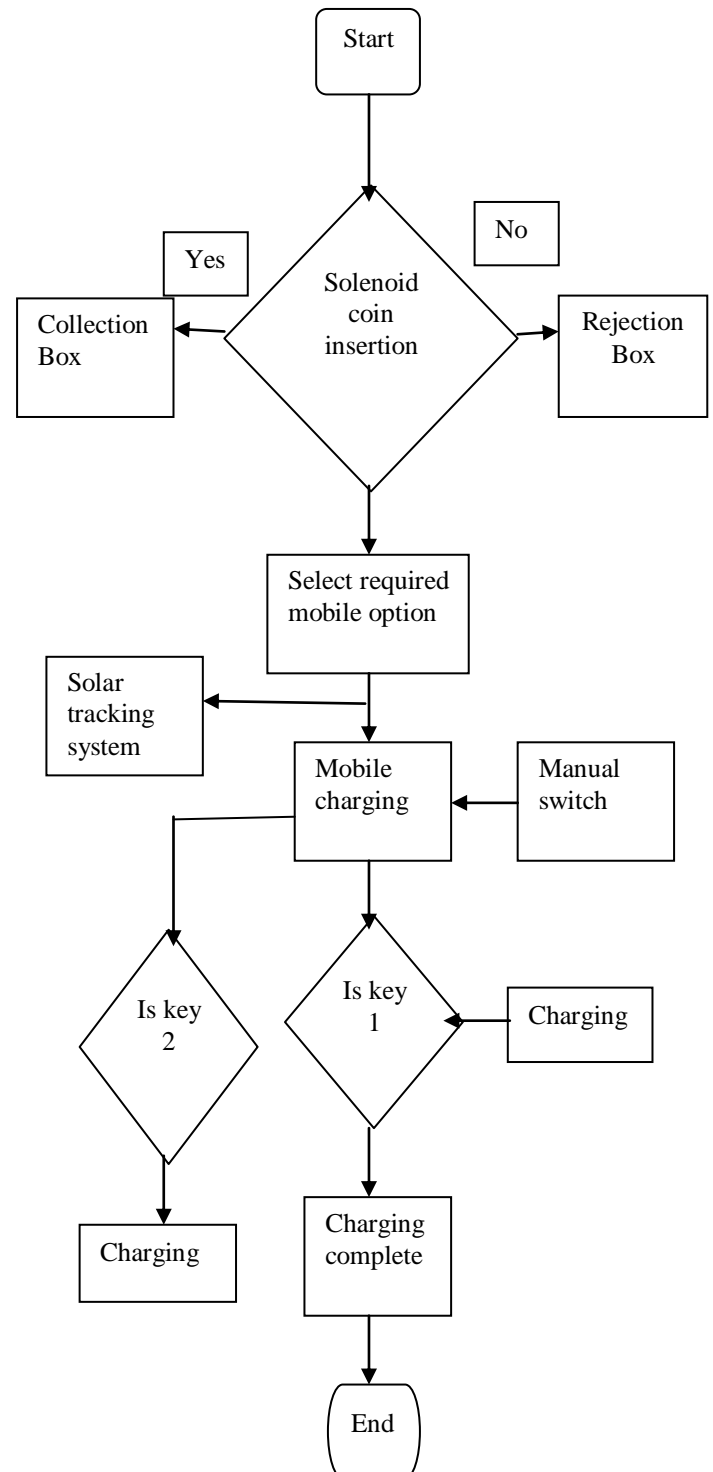
III. FLOWCHART

Fig 1.Flow chart of coin operated universal mobile charging with solar tracking
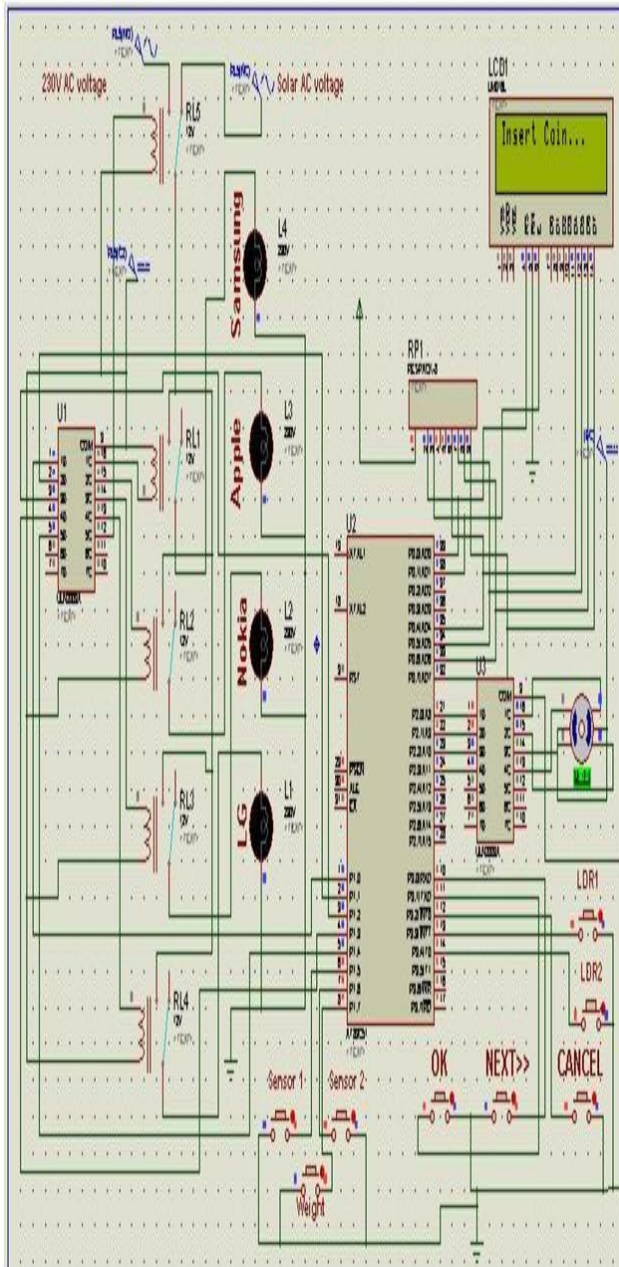
IV.   RESULT

Fig 2.Software Simulation for coin operated universal mobile charging with solar tracking

V.   CONCLUSION

In this paper charging of different mobile phone batteries is designed. It is developed for the areas where grid power is not sufficient all the day. It is useful for charging mobile in any place and there is no necessity of carrying charger with us. Low cost and economical.

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