International Journal of Advance Research in Science and Engineering
Volume No.07, Special Issue No.01, March 2018
www.ijarse.com
IJARSE
ISSN: 2319-8354

ELECTRONIC BOTTLE/CAN CRUSHER

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ABSTRACT

This project is about design of a Plastic Bottle Crusher which would help to crush the used Plastic bottles and would thereby help in waste management and disposal. This project aims to design a portable Plastic Bottle crusher that could be installed anywhere and would aid crush of used bottles.

In this project we are going to make this fully automatic by using electronics equipment like sensors, microcontroller, IC's etc. along with mechanical components due to which crushed cans or bottles are need not to segregate from bin and also machine will not run idle. After all process has been done, this crusher may help us to understand the fabrication and designing process as well as electronics equipment that involved in this project.[1]

Keywords: Aluminium, Bottle, Crusher, Electromechanical, Plastic.

I.INTRODUCTION

In a country like India, waste management and disposal of the waste seems to be a tedious task where a huge amount of wastes has been generated due to enormous consumption. There also lies an issue in transporting the wastes to the recycling plants, wherein a huge amount of effort, time and money needs to be put in for transporting the wastes which are clustered and are not in uniform shape or size. The waste materials needs to be made into a uniform shape for easy and effective transportation. This paper aims in producing a mechanical crusher which would be a helping hand for waste management.[2]

A can crusher can be defined as "A device used for crushing aluminium cans or plastic bottle for easier storage in recycling bins thereby giving you extra space by flattening of cans". An electronic can/bottle crusher is basically one of the most aid able machines. It helps to reduce the pollute environment of this world.

In order to reduce the waste, we planned to create can/bottle crusher that will reduce the volume of cans/plastic bottles by approximately 70% by which transportation volume will increase and transportation cost will reduce. It can be placed everywhere, in the park, houses, restaurants, malls, canteens even in cars.

This machine is developed solely for the purpose of recycling as plastic bottles are harmful to environment and aluminium to plants growth. Many people recycle items like paper, glass, and aluminium, while these efforts are a vital part of the process.

Main intension of this project, is to keep the city clean. Nowadays in India, recycling is one of the areas which rapidly increasing day by day. The amount of waste coming is in a tremendous quantity.

Bottle crushing machine is used for crushing plastic bottle for recycling purpose and also for easy storage in recycling bins. This project is based on electromechanical system.

II.FEATURE OF PROJECT

This project consists of designing and fabrication of an automated water bottle crusher machine.Bottle crusher is primarily used to save space and recycling. It helps to reduce the environment pollution. Thus helps us to create better place to leave. This bottle crusher can actually be the future mode of recycles apart from the recycle bins. It can be placed everywhere, in the park, houses, bus stand, railway stations.

III.METHODS & APPROCHES

A successful recycling program begins with a successful plan. The basic steps needed in forming that

planare included in this project[5]. The design of this project is according to the flow process below:

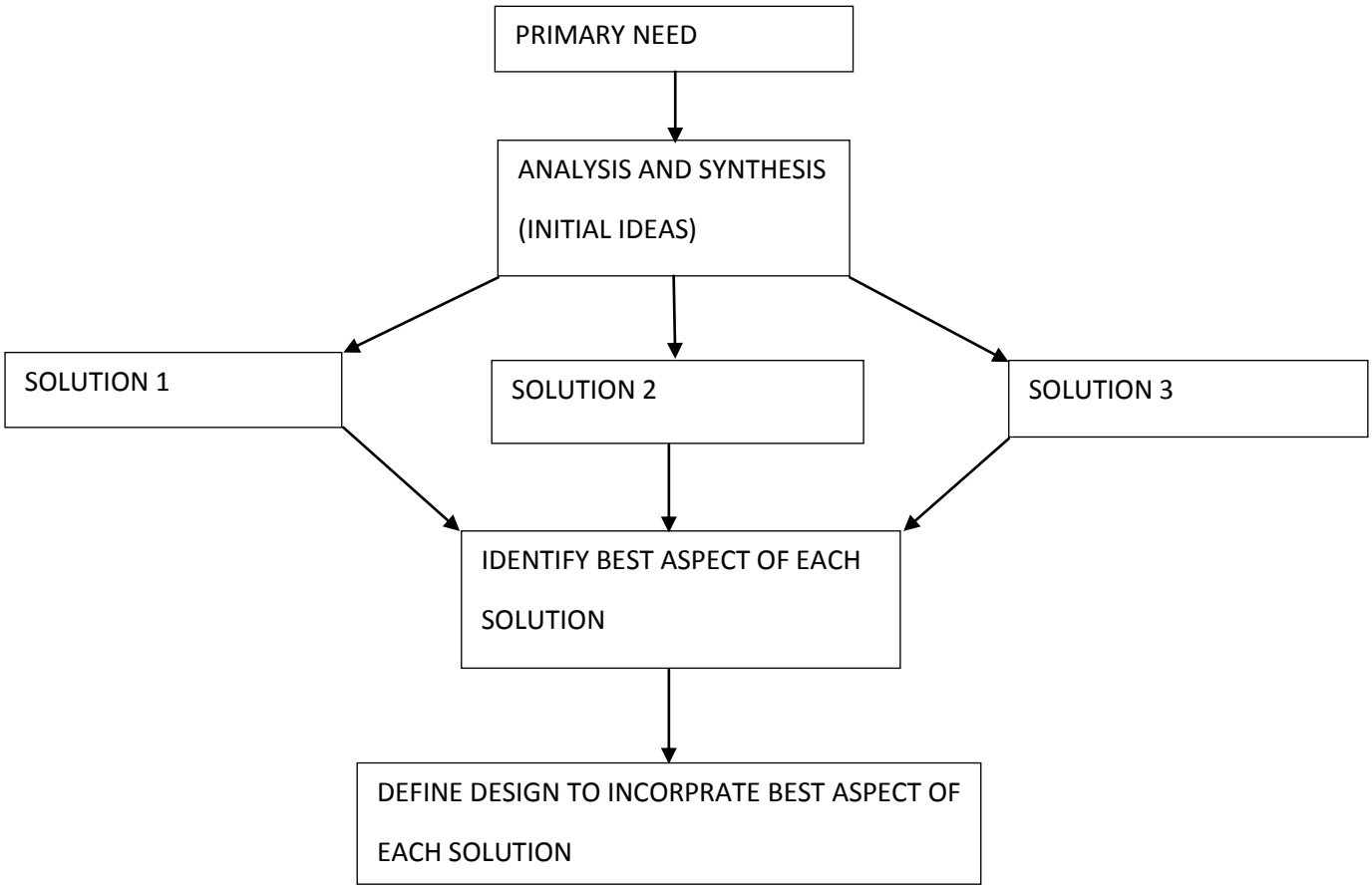

FIG.1.Flowchart of design Process[3]

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IV.DESIGN IDEA

This design idea is to encourage development of collecting/recycling programs to provide childrenand young people an opportunity to learn about conservation of resources, economics of supply and demand and important environmental issues using simple, attractive and an easy manipulative device as can crusher.

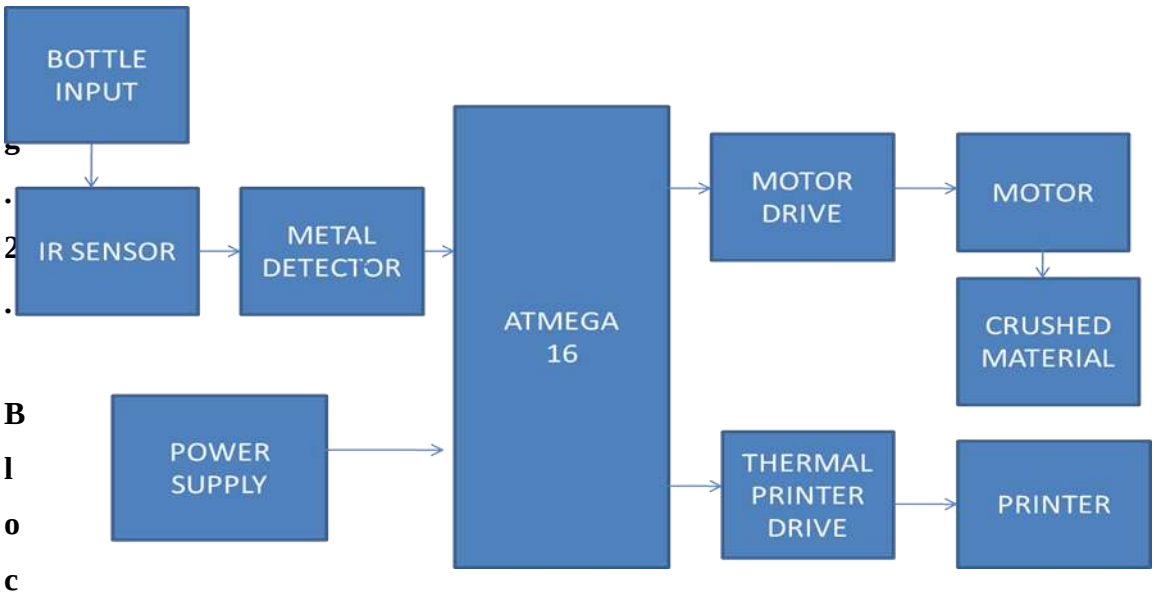
Based on the above mentioned facts on aluminium can recycling and environment concerns, especially clean schools and their surroundings, have been built an idea to design a device which would:

- Incites children to collect cans
- Assist children to crush collected cans
- Be easy and attractive for use;
- Enable easy transport of crashed cans.[4]

1. DESIGN CONSIDERATION

- Maximum Force required to crush the Can/Plastic bottles
- Considered elements
- Material of Cans Aluminium[5]

V.BLOCK DIAGRAM



g. 2. Block Diagram of Electronic Bottle Crusher

VI.WORKING

Working Procedure:This project is based on electromechanical system. This project consistof electronic and mechanical part mainly electric AC geared motor of 80 rpm, crushing drum, flange bearing, V belt, two gears of 130 mm, pcb that consist of micro controller. Two crushing drums are will rotate in opposite direction to squeeze the bottle and those two drums are driven by a single motor. In order to perform this opposite rotation. We have adopted external gear meshing arrangement and a belt driven pulley from the motor. The machine is provided with two opening at the top side to insert the bottle and tin. When we insert the bottle. It is detected by IR sensoror Proximity sensor, plastic bottle is detected by IR sensor whereas proximity sensor is for metal. This sensor detects the bottle and sends the signal to the micro controller that will give command to the geared motor to rotate and dispendthe coin. There are two motors; one motor will rotate at once depending on the bottle we have inserted. If the bottle is plastic motor one will rotate to dispend one rupee, if it is aluminium can motor two will rotate to dispend two rupees. Simultaneously the bottle will fall on crushing drum on the bottle gets squeezed between the two rollers. This crushed bottle will fall on the bin which is placed below the rollers.[6]

6.1. ATMega16 Microcontroller:

The ATmega16 is a low-power CMOS 8-bitmicrocontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega16 achieves throughputs approaching MIPS per MHz allowing the system designed to optimize power consumption versus processing speed.

1.2. 7805 Voltage Regulator IC:

7805 is a voltage regulator integrated circuit. It is a member of 78xx series of fixed linear voltage regulator

ICs. The voltage source in a circuit may have fluctuations and would not give the fixed voltage output. Thevoltage regulator IC maintains the output voltage at a constantvalue. The xx in 78xx indicates the fixed outputvoltage it is designed to provide. 7805 provides +5V regulated power supply. Capacitors of suitable values can be connected at input and output pins depending upon the respective voltage levels.

1.3. L293D Motor Driver IC:

L293D IC is basically used for driving the inductive loads like DC motors, stepper motors, and relays. It is a 16

pin DIP IC.It will simply amplify the logical input combinations from the microcontroller IC to drive the inductive loads like DC motor in our case. With thehelp of L293D IC we can drive two motors simultaneouslyat a time. It has four I/P pins and four O/P pins for controlling the devices by using microcontroller.For asingle motor the combinations oftwo I/P are used for taking the I/P from the microcontroller and afteramplification the corresponding two O/P combinations are connected with motor.

1.4. Metal Detector:

This metal detector circuit electronic project is based on transistors and will provide an visual indication using

A LED and an acoustic sound that will inform you when a metal is detected. This detector must be poweredfrom a simple 9 volt battery an it needs some little adjustments. To adjust this circuit you need to power it onand move it away from any metal object.

1.5. TSOP Sensor:

The TSOP 1738 is a member of IR remote control receiver series. This IR sensor module consists of a PIN diode and a preamplifier which are embedded into a single package. The output of TSOP is active low and itgives +5V in off state. When IR waves, from a source, with a centre frequency of 38 kHz incident on it, itsoutput goes low. Lights coming from sunlight, fluorescent lamps etc.

VII.ADVANTAGES

Human efforts can be reduced as well as time also.
Due to the electronic can/bottle crusher near about seventy percent volume can easily be reduced, thus transportation volume can be increased.
It helps to reduce the pollute environment of this world. Thus helps create a better place to live in.

VIII.APPLICATION

The can or bottle crusher machine is widely used in beverage industries or in scrap dealers shop.
It can be fixed at public places like railway station, bus stand, temples etc.

IX.FUTURE ENHANCMENT

We can implement the designing of garbage collector system as well as making the inert material from gathered garbage.

X.CONCLUSION

The volume of plastic bottles can be reduced to a large extent i.e. near about seventy percent volume can easily be reduced, thus transportation volume can be increased and transportation cost can be reduced to a large extent and these can be reuse.
The study on operation and mechanism of various types of crushers was done in the process and subsequently a crusher mechanism was designed to crush plastic Bottles. The mechanism designed can be used as a portable crusher and can be installed on waste bins. The design of exit port is such that it gives mechanism the agility to crush bottles as well as Cans of various dimensions. The mechanism designed is simple and utilizes optimum effort to crush bottles and cans and thud reduces volume of waste and aids recycling. The fabrication and analysis of this mechanism is in process.[7]

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