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Automatic Leaf Picking Machine

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Abstract: In Early days, Labours are used to take the banana leaf in banquet meal. So in order to reduce human work, the simple mechanism is used to take the leaf automatically by using Automatic leaf picking machine. The main purpose of this project is to pick the leaf automatically using the leaf picking machine. Initially in the existing system, the food was served in banana leaf. At that time banana leaves are picked manually by human beings in special occasions. Mostly in the function hall, the number of human resources required to collect the leaf is very high, in this type of process the time consumption is also very high. To overcome this problem, the paper Automatic leaf picking machine is proposed.

I. INTRODUCTION

Leaf picking was originally done by human beings in special occasions. If the banana leaf quantity is higher in the occasion, the human resource required for picking the used leaf is also very high. In order to reduce the work and time consumption, the automatic leaf picking machine is introduced[1]. This method overcomes the problem of manual methods of leaf picking.

II. PROPOSED SYSTEM

The main aim of the proposed work is to pick the leaf automatically after the consumption of food. In the function hall the number of persons required is very high for taking leaves, so to overcome this problem the Automatic Leaf Picking Machine is proposed. Therefore, by using Automatic leaf picking machine the time consumption and the human resource required is reduced. The waste leaf can be automatically collected by machine and therefore, it is a fast process. The sharp edge is used for taking the leaves into the conveyor belt. So the conveyor belt is used to carry the used leaves and it pass the used leaves to the collecting box[15]. Before the leaves are taken to the collecting box, the leaves are made into pieces using the cutter.

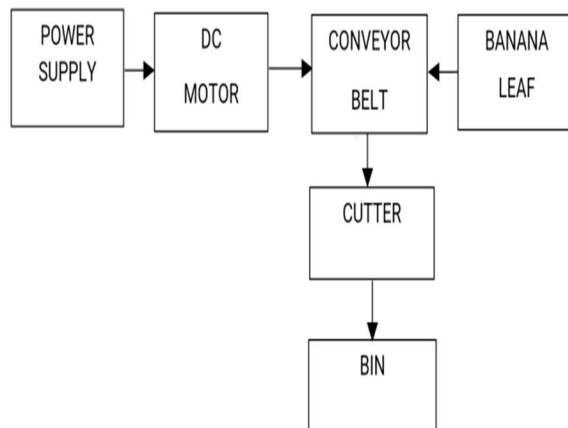


Fig. 1. Block of Diagram automatic leaf picking machine

The above Fig.1 shows the block diagram of automatic leaf picking machine

When the leaf reach the end of the conveyor belt the cutter which is fixed will cut the leaves into small pieces and then it is taken to the bin. The basket is fabricated in such a manner to collect at least 20 number of leaves from the floor. The power supply is switched ON using the connection of 12V battery and 7.5 amps current[13].

The DC motor is made to rotate[2]. This causes the roller action and therefore, the conveyor belt moves. The banana leaf which is kept on the floor is taken using the sharp edge plate of the leaf picking machine and through the conveyor belt the leaf is taken to the bin. Before leaving the bin the leaves are cut into small pieces using the cutter which is fixed at the end of the conveyor belt.

III. COMPONENT DESCRIPTION

A. Power Supply

The battery used here is a regular battery which is used generally in many applications. The 12 volt battery looks different depending on its use. In some ways, it is one of the most diverse of all batteries. The battery will be able to be recharged as current. Limit initial current is 2.16A. Charge until battery voltage reaches 14.4 to 14.7 volts at 68°F (20°C). Hold at 14.4 to 14.7 volts until current drops to under 77mA. Battery is fully charged under these conditions, and charger should be disconnected.

The below Fig.2 is the 12V battery used in the automatic leaf picking machine. These batteries are excellent for use in many applications because they do not need maintenance during the off season and the batteries can be stored in any state of charge without the worry of degradation.



Fig. 2. 12V Battery

It can hold upto 50-100% charge before storage. It can be large or small, heavy or light and sizes of 12 volt batteries vary widely used on the amp hours.

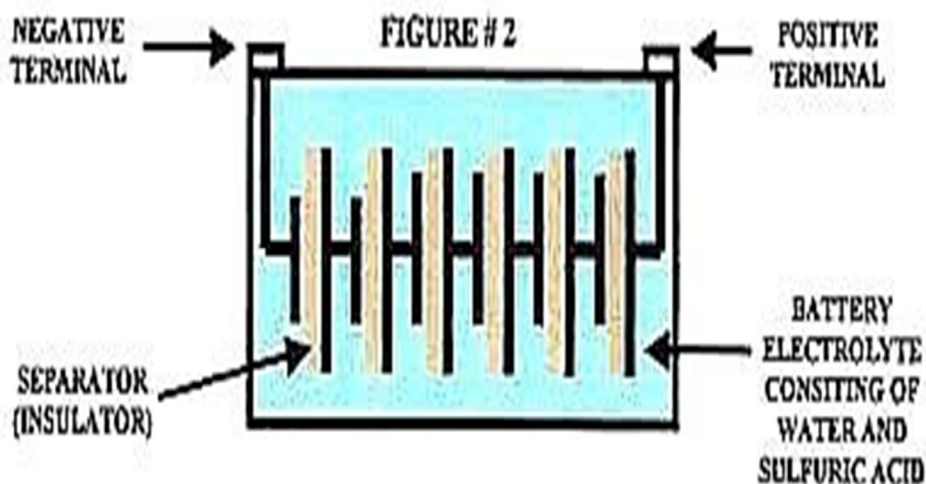


Fig. 3. working of battery

The above Fig.3 shows the working of battery, It consists of 12 volt battery supply and 7.5 amps current.

The model of battery is PS1275 and rechargeable sealed lead acid battery. It is given to a DC motor, which is connected directly to the positive terminal and negative terminal supply to the DC motor.

B. DC Motor

The below Fig.4 shows the DC motor used in automatic leaf picking machine



Fig. 4. DC Motor

The DC motor is one of the machines devised, which convert electrical power into mechanical power. The principle of working of a DC motor is that "whenever a current carrying conductor is placed in a magnetic field, it experiences a mechanical force".

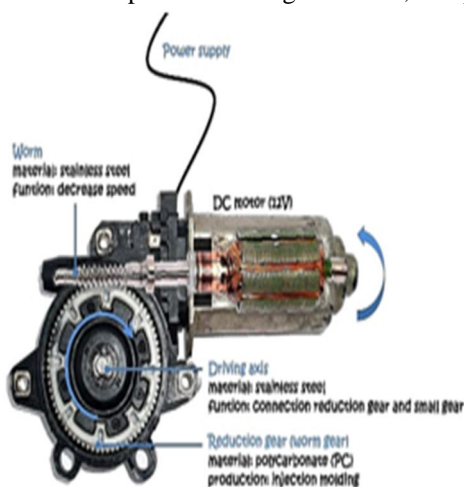


Fig. 5. Working of DC Motor

The above fig.5 shows the working of a DC motor. It widely used in the opening and closing of car windows [5]. DC motor is 12 volts and 2.5 Amps, which operate the load speed at 48 RPM. The 12 volt battery is connected with DC motor. DC motor directly connects to the positive battery voltage to one motor wire and battery ground to the other motor wire. The motor should run in one direction. DC motor is used to run the conveyor belt and it is placed near the upper shaft to handle easily. The upper shaft is connected to the middle of a DC motor to run the upper roller and then the conveyor starts moving.

C. Conveyor Belt

Belt conveyor system perform the material transportation from one location to another location[11]. A belt conveyor is a typical energy conversion system from electrical energy to mechanical energy. The energy efficiency of belt conveyor focuses on the operational level and the equipment level.

This is a special type of conveyor belt, which looks like a rubber type material. The conveyor belt is PVC (polyvinyl chloride conveyor) black material type which is shown in Fig.6, The conveyor belt has been fitted with two roller, one is upper and the other is lower. The shaft is connected with two rollers, one shaft which is located upward is connected to DC motor and the other shaft at the problem is kept constant.

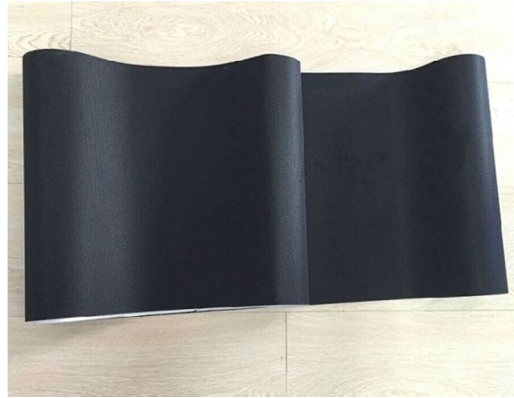


Fig. 6. Conveyor Belt

The upper roller will rotate in one direction and the lower roller is at a fixed position, then the conveyor belt starts moving [3]. The conveyor belt is slanted at a particular angle or position, and then the banana leaf picked from the floor is taken through the conveyor belt. The conveyor belt is made up of PVC material, it is used to carry out the banana leaves without any restriction.

D. Bearing

The bearing are used in a wide variety of application, they are simple in design, non-separable, suitable for high speeds and are robust in operation, and need small maintenance[4]. The bearing device allows the constrained relative motion between two or more parts, typically rotation or linear movement.

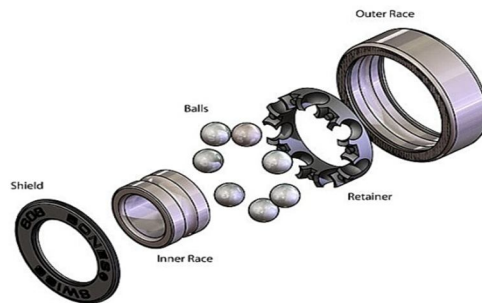


Fig. 7. Inner and outer bearing

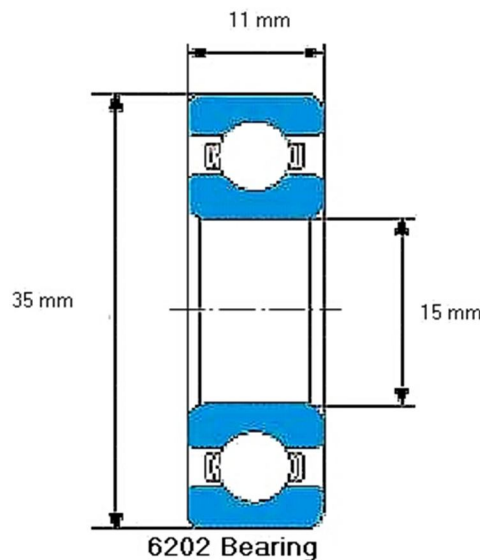


Fig. 8. Dimensions of bearing

In this work the bearing used is 6202 model, which mainly used to control the shaft. Bearing is connected with the shaft and it has an inner diameter and outer diameter. The inner diameter is about 15mm and the outer diameter is about 35mm along with the width is 11mm.

IV RESULT AND DISCUSSION

The proposed system is successfully implemented and the leaf has been picked automatically using the automatic leaf picking machine. The power supply is given to the motor, then the motor gets ON, so that the conveyor belt will rotate.

When the person moves the machine the sharp edge of the machine will pick the leaf from the floor. The conveyor belt will carry the leaves into the bin. Before reaching the bin, leaves are cut into small pieces using the cutter, which is fixed near the end of the conveyor [6]. Finally the bin will be filled with leaves which are crushed.

A. Automatic Leaf Picking Machine Design Process

Conveyor belt design for leaf picking process was done by using Auto CAD.

Length: 60 centimeter

Width: 45 centimeter

Height: 2 Meter

Angle: 30 degree

B. Output of Automatic Leaf Picking Machine

The automatic leaf picking machine uses simple mechanism and simple construction of picking the leaf automatically from the floor.



Fig. 9. Output of the automatic leaf picking machine

The above Fig.9. Shows the output of the automatic leaf picking machine Implementation of automatic leaf picking machines uses motor, conveyor belt, bearing, cutter and collecting bin for the picking process of the leaf after the end of the banquet meal.

The sharp edge plate fixed in the machine used to pick the leaf from the floor and taken to the conveyor belt. The conveyor belt is used to carry the leaf to the crushing unit and after the crushing process is over. The crush leaf is collected in the collecting box.

Initially in the existing system Labours are used to collect the leaf at banquet meal. In this type of process the time consumption is more. So to avoid the time consumption and human work the automatic leaf picking machine is proposed. And this process is a fast process and it can pick more number of leaves in effective manner.

VI. CONCLUSION

Leaf picking can be done using manual methods. But we have chosen automatic leaf picking method because it reduces time consumption and human resources.

Customer satisfaction is good in automatic method and cleanliness is maintained in a perfect way. Number of leaves collected will be higher in automatic method than in manual method. Therefore the automatic leaf picking method is more preferable than manual methods.

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