

Fabrication of Electric Motor based Mini Cultivator

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Abstract— Agriculture being one of the major in farms are costlier and not affordable to farmers, hence to overcome this problem we were make this model. Occupation in India, it is very essential to discover and implement new idea in this field where lot of work has been done. Agriculture may play a vital role for Indian economy. Earlier farmers were using Traditional farming method which is time consuming, hardworking and costly, hence we introduce new technology. Generally, the machines are used for the farming purpose in India which is of higher level. All machines were used.

Key words: Agriculture, Cultivator, Traditional Farming

I. INTRODUCTION

It is observed that, these ideas are not been implemented properly in actual agricultural field. This is due to more cost and is daedal for rural people. Multipurpose agriculture equipment is basic and major equipment involved in agriculture for maximum yielding. Some of the major problems in the Indian agricultural are rising of input costs, availability of skilled labors, lack of water resources and crop monitoring presently there are many agriculture cultivator machine are available but this machines are costly. Mostly cultivator machine is engine based which are not affordable by small farmers and engine-based machine emits more carbon dioxide which are harmful for environment. So we decide to make a cultivator machine which work on geared motor by supplying it solar energy by using solar panels.



Fig. 1: Front View of Model



Fig. 2: Side View of Model

II. METHODOLOGY

The method we followed to complete the project is as follows.

- Step 1 : SELECTION: - Selection of project
- Step 2 : SURVEY: - Existing product = Scope for improvement
- Step 3 : DESIGN: - Design of frame and wheel = Analysis of frame and wheel > calculations
- Step 4 : FABRICATION: - Procurement of material = cutting, welding, drilling.
- Step 5 : ASSEMBLY: - Fitting all the parts = Welding
- Step 6 : TESTING: - Testing of the working prototype model
- Step 7 : RESULT: - Need high torque of motor result obtained from testing.

III. LITERATURE REVIEW

1) *Review on design and fabrication of motorized low cost cultivator.* [Satyajit Ghorpade]

In this research paper the author used car wiper for cultivator tool. He was thinking about the modern mechanical farm mechanism. In their, they doesn't used solar panels for power generation so we get idea form that to place solar in our project. We take main advantage from that is it required human effort on small land.

2) *Semi-Automated Motorized Cultivator for Agriculture.* [Shreeshayana R, Manjunath V Gudur]

In this research paper Agriculture process includes Ploughing, Planting, Watering, Weeding, Harvesting and Delivery. The primary purpose of ploughing is to turn over the upper layer of the soil, bringing fresh nutrients to the surface, while burying weeds and the remains of previous crops and allowing them to break down. They using Plain iron rod for ploughing.

3) *Multipurpose Farm Machine* [C. N. Sakhale]

In this research paper they used 24cc engine for digging operation. And for spraying used motor with 12V battery.

Next two operations are manual base which is cultivation and sowing. This machine perform four farming operation (digging, sowing, cultivation, spraying) which is used small scale farming.

4) *Design, Development and Fabrication of mini cultivator* [Shabbir J. Karjatwala, Chetan L. Kurkute]

In this research paper they made project from 4.5-6 HP of engine but they need more fuel for running it.

5) *Development of an Electric Powered Tiller for House Gardening* [Haruo Sakamoto]

In this research paper the author is Japanese they used Japanese nano sensors for making it automatic. The tiller equipment is mounted on tractor which is fully automatic.

IV. PRINCIPLE PARTS

The wheel chair consists of following principle part wheel

- A. Frame
- B. Plastic wheel
- C. DC Geared Motor
- D. Solar Panel
- E. Chain & Sprocket
- F. Battery
- G. Cultivator tool

A. Frame:

A frame is a structural system that supports other components of a physical construction or steel frame that limits the construction's extent. The dimension of frame is 400mm * 310mm. Height 160mm. Handel dimension 1000mm * 460 mm. Middle gap 260mm.

B. Gear Motor:

A gear motor is used as locomotion unit and this motion is transmitted to the sprocket through chain. This motor is mounted on a support provided by the Angel. The dimensions and specifications of gear motor are obtained from standard motors available. The battery availability in the market is of 12V, so to provide the required voltage for the motor two batteries are connected in series to make 24V. The connection for the motor.

C. Solar Panel:

The solar panel is connecting mounted on frame. It store sunrays and supply to battery in the form of electrical energy.

D. Chain & sprocket:

The chain and sprocket is mounted on geared motor by giving supporting angel. We are using 12 and 10 teeth of sprocket.

E. Battery:

We are used 12v of battery for giving it electric supply. We mounted battery on frame by making battery box.

F. Cultivator tool: -

It's a tool which we using in our project. It function is to take out soil from field by rotational movement.

V. ADVANTAGES & DISADVANTAGES

A. Advantages

- The cultivator machine can be used for gardening as well as for small land for farming.
- Time consumption reduced.
- Women as well as senior citizen can be used this machine.
- Due to solar power no need of external power supply

B. Disadvantages

- The motor is of less torque so it cannot plough field.
- For doing work in farm field 48v of BLDC motor required.
- The battery capacity required is 48v of lithium ion which is rechargeable.

VI. APPLICATION

- Farming Purpose
- For gardening

VII. CONCLUSION

The design of the frame is good but it is heavy. After doing trail we find that to ploughing the field we need high torque of motor as well as we also need lithium ion battery of 48v to running the motor. The cultivator tool is in good condition. The cultivator model work smoothly

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