International Journal of Advance Research in Science and Engineering
Volume No. 10, Issue No. 07, July 2021
www.ijarse.com
IJARSE
ISSN 2319 - 8354

ELECTRICAL CULTIVATOR

Rahul Rai[1], Nitish Kumar Patel[1], Pradeep Yadav[1], Pujesh Verma[1], Pushkar Kumar Tiwari[1], Mr. Shyam Bihari Lal[2]

B. Tech Student, Dept. of ME, Buddha Institute of Technology, Gorakhpur, Uttar Pradesh, India[1].
Asst. Professor, Dept. of ME, Buddha Institute of Technology, Gorakhpur, Uttar Pradesh, India[2].

ABSTRACT

Agriculture process includes ploughing, planting, watering, weeding, harvesting. In agriculture, before every farming process the first and foremost important step is tilling and ploughing of land which we are going to cultivate. Our project will help everyone individually to plough and cultivate crops in their own land and garden. The idea of our project had arisen from the problems in existing model. One of the problems is high cost and other is single functional purpose only. The primary purpose of ploughing is to turn over the upper layer of soil, bringing fresh nutrients to the surface, while burying weeds and the remains of previous crops and allowing them to break down. Electric cultivator or power tiller is a walking tractor widely used for rotary or revolving cultivation. For small and marginal farmers a Electric cultivator is the best choice. In this paper Ergonomic Electric motorized cultivator for agriculture purpose is designed which is be able to plough in 15 inches gap distance in irrigation fields where cattle's find difficult to pass.

KEYWORDS- Electric cultivator, Ploughing, Functional, Bringing, Nutrients, Ergonomic.

I. INTRODUCTION

India is a land of vast population, where food is the top most need for each and every citizen of it. Indian economy is mainly based on the agriculture and it will continue to remain so for a long period of time. About 75% people living in the rural areas and still dependant on agricultural foods. About 43% of geographical area is used for agricultural activity. Electric cultivator is a walking tractor widely used for rotary or revolving cultivation. For small and marginal farmers a Electric cultivator is the best choice. It is a machine completed with a DC motor, 48 volts battery and controller designed as such to push forward and backward motion. It replaces the animal power more efficiently and helps in arising demand for human labour. It has multiple uses and advantages. Electric cultivator is ideal where the land side is small. It is a farm machine that is mainly used to cultivate the land. In terms of maintenance, it is cheaper and economical to use and also require less space. An Electric cultivator is very easy to use it just needs to be balanced and it drives automatically.

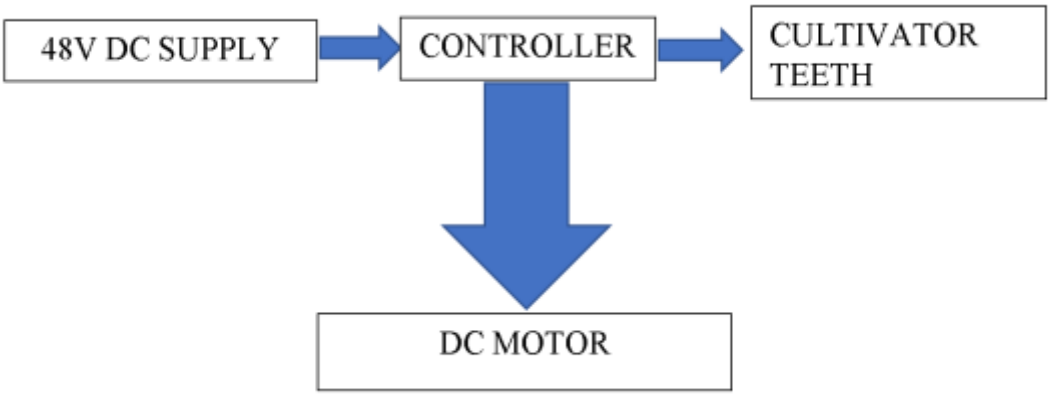
International Journal of Advance Research in Science and Engineering
Volume No. 10, Issue No. 07, July 2021
www.ijarse.com
IJARSE
ISSN 2319 - 8354

II. LITERATURE REVIEW

On overview, it look like an Electric machine. But that Electric machine will help in the agricultural field. If you need to farming in your small field then it is very suitable option for you in agricultural field. It is known as ' Electric cultivator' or ' Power tiller'. The first country to use power tiller on large scale was Japan. The first successful model for power tiller was designed in the year 1947. During the year 1950 to 1965 the production of electric cultivator increased rapidly and Electric cultivator was introduced in India during 1963. But at that and till now power tiller's size large and these are not comfortable for small scale farming. These are not affordable small farmers also. But we design a small Power tiller or Electric cultivator on low cost and that is affordable for small landlord and small farmers.

III. WORKING PRINCIPLE

In this paper, engine is setup at the top of the frame and with the help of chain which rotate on the sprocket. Front wheel moves forward with the help of motor and moves forward with the help of motor and chain drives and at rear the plough is fitted. when wheel goes forward the ploughing is done on the bottom of the rear through the teeth of plough.



IV. DESIGN & FABRICATION

DC MOTOR: The motor is attached on the front of machine mainframe. The motor is used to provide the drive necessary for the forward and backward motion of machine. On the motor shaft a gear is mounted to transmit kinetic energy of motor to wheel through the

connection of chain drive. A working voltage of motor is 48 volts and capacity of motor is 900 watts.

DC CONTROLLER:

48 volts and 900 watts DC controller is used for precise motion and speed control of DC motor. It is mounted on the frame to the backside of the motor.

LEAD ACID BATTERY:

There are four lead acid battery, each of 12 volts are connected in series to build a voltage of 48 volts that is suitable to drive the motor with more power and torque. The battery acts as

the power source for the machine, the ampers rating selected is 50-amp hour. These batteries are more affordable and has a battery efficient and less heat is generated.

WHEEL & CHAIN:

There is a single wheel which is fitted on the front of the machine and cultivating plough is provided at the rear portion. Chains are made of metal and, therefore occupy lesser space and give constant velocity ratio. S Pockets are provided on both motor shaft and at the centre of wheel. Chains are run over which. A Sprocket has projected teeth that fits into the recesses in the chain.

V. APPLICATION

1. An electric cultivator is often the best choice for people with small forming area.
2. Electric cultivator used in
    - Sugarcane farming.
    - Rice cultivation
    - Garden cultivates

- Wheat farming

3. The electric cord has to reach all parks of your garden and you have to make sure the cord can get around tress and plants without squashing or pulling on them.

VI. ADVANTAGE

1. They are lightweight, so they are easy to carry to one place to another place.
2. They are small in size so they take up less storage space.
3. There small times allow you to weed and cultivate the space between your crops with minimal risk of damaging your plants.
4. It required less maintenance.

VII. CONCLUSIONS

The main objective of designed modal was achieved, which mainly focused for forming and gardening applications. Less skilled worker can easily operate this machine, this equipment consists of a low maintenance cost. The total investment cost is also very low as a suggested scope of improvement, by making chassis more stable by using metal having more strength vibrations can be avoided. Casing can be provided to give more safety to the motor battery and circuit.

REFERENCES

[1] https:// www.google.co.in/ search electric cultivator project.

[2] Newton Roy Gingerich (1998) "Electric powered small tractor" united states patent, patent number: 5,743,347.

[3] Shabbir S. Lad, Hitesh K. Jadhav, Tejshree R. Daithankar "design development and fabrication of mini cultivator and tiller" *OAIJSE*, Volume-3 Issue 1, March 2018.

[4] Shreeshayana R, Manjunath V Gudur "semi-automated motorised cultivator for agriculture" *IJCRT*, Volume 8, Issue 7 July 2020.

[5] Er. Mathan M., Sanrhose.S, Sri Vishnu L.R, Surya Prakash R "Fabrication and Testing of Battery Powered Weeder" *IJESC*, Volume-9 Issue -3.

[6] Haruo Sakamoto "Development of An Electric Powered Tiller for House Gardening" Journal of Asian Electric Vehicles, Volume-5, No-1, June 2007.

[7] Akash L. Kundu, Anmol L. Nalawade, Sushant S, Kolhe, Rahul S. Warghane" Irjet, Volume-6, Issue-3 March 2019.