

Fabrication of Farm Cultivator

Mr. Sunil Kumar M¹, Vishal sah², Harish K³, Virupa Samudram Poornima⁴,
Ram Kumar Mahato⁵

¹(Assistant Professor, Department of Mechanical Engineering, Bangalore Technological Institute, India)

²(Mechanical Engineering, Bangalore Technological Institute, India)

³(Mechanical Engineering, Bangalore Technological Institute, India)

⁴(Mechanical Engineering, Bangalore Technological Institute, India)

⁵(Mechanical Engineering, Bangalore Technological Institute, India)

Abstract: The main objective of our project is to design and development of ploughing machine to use it for cultivation of soil. Our aim is to reduce the man power required for the operation of the plough. We thought of solution being that instead of automating it fully we planned to semi automate it using engine, motors and power transmission equipment. This might help us reaching our goal by reducing the man power as well as cost. In this work we are planning to design& fabrication of ploughing machine to use of agricultural operations.

Keywords: Paddy Farm Cultivation Machine, Reaper and Manual Operator

I. INTRODUCTION

In the country like India where the main source of income is agriculture. Agriculture is the backbone of India. In India agriculture is facing serious challenges like scarcity of agricultural labor, in peak working seasons but also in normal time. This is mainly for increased nonfarm job opportunities having higher wage, migration of labor force to cities and low status of agricultural labor in the society. mechanization. As introducing advanced technology for ploughing & weed removal, a ploughing machine is done with using bike engine which gives more mileage & meanwhile it produced in lower price, this equipment is useful to farmers for ploughing, weed removal & so on, the tool holder which is provided at rear end is flexible to adopt different types of agriculture tools for various agriculture operations, this machine is extremely cheap in cost & can serve a needful to the farmers. In today's world everything is getting modernized. Agriculture fields are slowly destroying & these lands are used for some other purpose this is because the income from agriculture is less, although the work involved is high. Most of field work is done manually & so the farmers depend on fields workers for doing it.

To design and analysis the machine which will help the Indian farmer in small farm. It will reduce the cost of Ploughing the field. It will help to increase economical standard in Indian former. The design of the machine will be presented by using Solid edge software. In India most of the farmer plough there manually. Thus, our intention is to provide farmer a "Farm Cultivator machine in Agriculture Approach". This machine consists of simple Mechanism make to run by a 2-stroke diesel engine which will be economical to farmer and will take less time for operation. It will help to increase economical standard in Indian farmer. There are various types of power used to operate the machine. During the process of development in the world various new experiment has been done in the world of science. Like solar energy is the widely used type of energy in the world. Likewise various other source of power generation is dc motor, dc battery, petrol/diesel engines.

II. LITERATURE SURVEY

C. N. Sakhale et al. [1], According to the author multi functional agricultural vehicle mainly focuses on basic problems faced by our fellow farmers i.e., seed sowing, water spraying, cultivation and digging. Cultivation tool is removable. This operation is done by manual force. For spraying motor, battery and switch is given. When switch is on fertilizer pump from motor, enter to the spray nozzle then it sprays with high velocity to the crops. In our machine the cultivation tool i.e., the tiller will be removable for the ease of transportation purpose and also the operation can be carried out by manual force.

Thange R.B, et al. [2], The author studied and developed agricultural needs to find new ways to improve efficiency. One approach is to utilize available information technologies in the form of more intelligent machines to reduce and target energy inputs in more effective ways than in the past. Here author is trying to make such equipment that will perform no. of operations like sowing, weeding, grass cutting, tillage, spraying, etc. So, we will be making the sprayer drum of plastic and will have capacity of 15 liters which will be used for spraying purpose. Existing old machines had the individual storage place and separate individual mechanism which leads

to more cost. The drawbacks in the existing machine are rectified successfully in our machine.

Amol Nalawade et al. [3], The author presented the information about the different innovations done in seeding machines available for farming and plantation purpose. In this the main aim of seed sowing operation is to put the seed in rows and at desired depth and having a particular spacing between seed to seed with soil and provides a proper exertion of a force over the seed. So, it shows proper row spacing within the seeds, their seed rate and their depth associated with different agro-climatic conditions to achieve optimum yields. Our equipment consists of a low maintenance cost which does not consist of a fine texture which can be easily broken or damaged.

Nagesh Adalinge et al. [4], Here the author has proposed that seed sowing machine is a device which helps in sowing of seeds in the desired position hence assisting the farmers in saving time. When the equipment is pushed forward by using handles, the front wheel rotates and the gear is mounted on the axle of the wheel start to rotate and its rotation is then transferred to the pinion through chain drive. The rotary motion of pinion is converted into reciprocating motion by simple slider crank mechanism. Improved seed drills are provided using seed and seed boxes and by seed metering mechanism for variation of seed and seed dropping rates.

Pradip Gunawat et al. [5], The author proposed that the objectives of seed planter machine are to put seeds at desired depth with constant seed spacing and covering the seed with soil. Our machine is suitable for planting seed in ridge and furrow method, flat arrow method, flat bed method as well as multi cropping. The main objective of our machine is to reduce human effort and back ache of Farmers. Tooth Bevel gear is used to convert rotational motion into Linear.

III. OBJECTIVES AND METHODOLOGY

3.1 Objectives

The main objectives of this proposed machine are as follows:

- To formulate an idea to suit our required functionality.
- The main objective of our project is to design and development of ploughing machine to use it for cultivation of soil.
- To develop the idea to suitable mechanical principles and to design the idea to practice.
- To fabricate the design with the knowledge and the selected material which are cost effective.
- To modernize the farming system of the country.
- To reduce the cost of crop cutting.
- To reduce the employment problem of the country.
- Design should be 'Simple' to operate and 'Safe'.
- It should require Less Man Power.
- The design should be Robust and Reliable.

3.2 Methodology

- Consulting with the local peoples who have small scale and large-scale farm.
- Consulting with agricultural equipment manufactures to know about available equipment and recently in demand equipment.
- Referring several research papers regarding machine.
- Discuss with the local farmers who have small scale land holding.
- Discuss with the agricultural equipment manufacturers to get information about various equipment that are available and are in demand.
- Design the machine part.
- The complete design was calculated by considering the total cost of the vehicle and these considerations are diesel engine, motor and frame.
- The process of construction and mechanism involved in the operation of developed prototype are discussed here.
- The diesel engine is fitted into the head.
- Moto is also connected to diesel engine. When diesel engine starts then motor rotates which makes the cultivator move.
- The tool is dug into the field and it starts digging the land.

IV. WORKING PRINCIPLE

This is equipment used for ploughing the land by using the bike engine that is 2-stroke IC Engine and as well as it can remove the weeds which grow in different crops so that the machine can be used for multipurpose

and reliable this device has a bike engine which will work on petrol and serve the farmers in better way. As the engine operates it drives the wheel by using sprocket & chain mechanism, as this device moves in forward direction the wheels rotate and move in forward direction the engine is mounted on the frame and back side of the equipment is flexible to adopt different tools for various agriculture operations.

The project work requires a frame for good support and stability. The frame material was initially collected and fabricated depending on the size required. The overall fabrication of the project model was done starting from frame to end project. These components are very important in fabricating cutting machine. Missing or not having any of the following components will lead to failure in fabricating the machine. There needs to be the good knowledge of material properties to be able to choose the good material for the best result of fabricating machine.

- Frame Diesel Engine
- Bevel Gear Mechanism
- Collecting Mechanism
- Crank and Slotted Lever Mechanism
- Chain
- Chain Sprocket
- Ball bearing Assembly
- Shaft

V. FIGURES

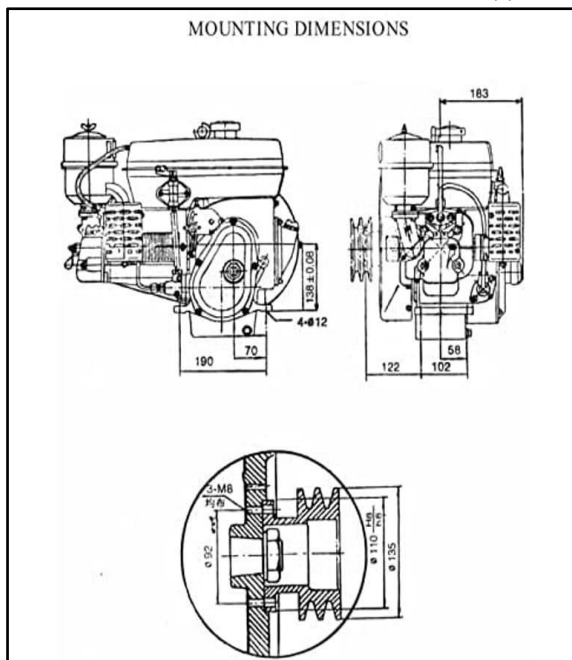


Fig. 1 Petrol Engine

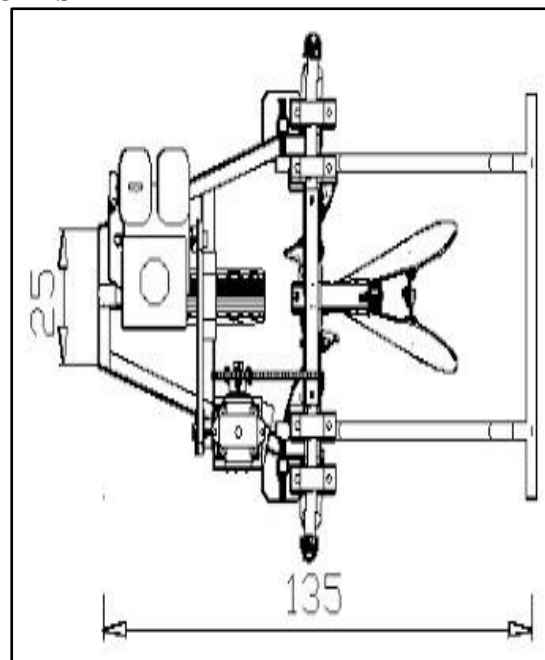


Fig. 2 Top View



Fig.3 Wheel

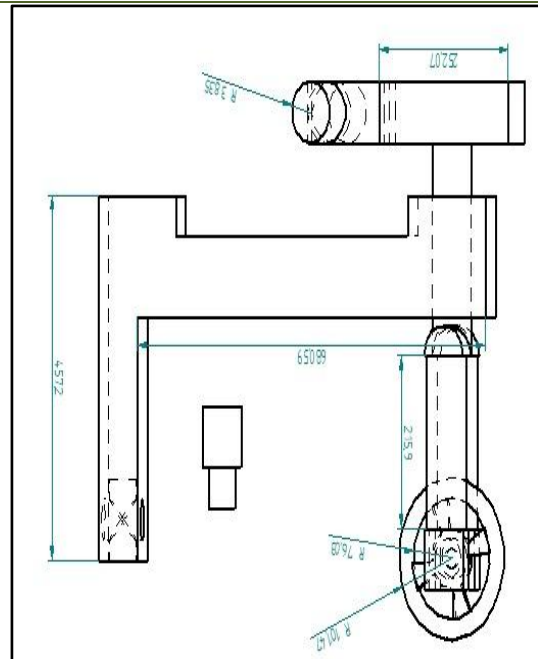


Fig. 4 Cad Model of Frame



Fig. 5 Completed Project Model

VI. CONCLUSION AND FUTURE SCOPE OF WORK

6.1 Conclusion

This machine can be used to plough the field. Machine can be driven with the help of engine so can be used in vast trimming. The cost of Ploughing using this machine is considerably less as compare to another Cultivator. Poor farmers can easily afford this. The performance through manual cutting cannot be the same throughout the day, as man get strained, whereas a machine cannot therefore, 80% of the time can also be saved by using this machine. It is concluded that the device is most economical. The machine was tested on a field to check its Ploughing and efficiency. The Cultivator available in market are suitable for large farms, so this can be the best machine for the farmers with small land. The success of this machine depends on how the farmers receive this machine as their ally. There are some changes that need to be done on the machine and a final

product is to be taken out for sell. From this work the following conclusions were drawn for the work to be in lacer area without manually, whereas by using it we can complete the same work in the same area (1acer) with only one labor. The same throughout the day, as man get strained, whereas a machine cannot.

Hence the effort on making this machine is to bring and facilitate the farmer with easy and effective use of machine in farming.

6.2 Future Scope of Work

Though the machine has some innovative concepts, there is still a lot if scope for development like

- The machine has to be provided with gear box for different speed ad torque generation.
- The machine can be made lighter by doing detailed analysis of the design and removing excess material wherever it is not necessary.
- There is lot of space wastage in the threshing unit, the design of the components should be meticulously refined.

REFERENCES

- [1]. C.N. Sakhaleet al, A Review paper on Multi \purpose Farm Machine, International Research Journal of Engineering and Technology IRJET, Volume 3,Issue9, PP900-995, 2016
- [2]. Thange R. B et al, Design and Fabrication of Multipurpose Agriculture Equipment, International Research Journal of Engineering and Technology IRJET, Volume 2, Issue 3, PP23951052, 2016
- [3]. Amol Nalawade et al, Universal Multipurpose Cultivator, International Research Journal of Engineering and Technology IRJET, Volume 2, Issue 3, PP90012008, 2019
- [4]. Nagesh Adalinge et al, Design and Manufacturing of Seed Sowing Machine, IJARIT, Volume 3, Issue 2, PPV3121407, 2017
- [5]. Pradip Gunawat et al, Farm Mechanization by using seed planting machine, International Research Journal of Engineering and Technology IRJET, Volume 2, Issue 3, PPS1991006, 2017