

Harvesting Machine

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Abstract: This paper addresses the development and performance of human powered multi crop harvesting machine. We have developed a mechanism for harvesting of different crop so that we can an easy harvesting in minimum period of time. This set up is used to harvest the crop which helps formers. Also this set up uses the manpower of labor by pushing force which is provided with different sprocket, chain, rubber wheel, and spur gear mechanisms which results in transmission of this manual motion into rotary motion of conveyor at the end of which the crops get harvest easily without any hard effect.

Index Terms- cultivator, body frame, chain, sprocket, collecting tank, etc.

I. INTRODUCTION

1.1 Problem statement

By traditional harvesting process, we can harvest 1 acre underground crop in 2-3 days. It is highly time consuming and low efficient. At the time of harvesting, the harvesting process takes too much time hence harvesters are machines designed for underground harvester machine. This machine can finish mining, soil and crop separation in one time and can harvest the crop. It is a multifunctional machine. This is very efficient and also reduces damages of crops during harvesting. And also those harvesting machine are present these are quite expensive.

1.2 Objective

1. Aim of this project is to design and develop small scale low cost compact harvester which reduce overall cost of underground crops harvesting in form of labour cost and harvesting cost.
2. To provide proper utilization of wastage which is useful for cattle.
3. To reduce overall harvesting time as that of traditional harvesting time.

1.3 Scope

Now a days, the automation of agriculture is the need of time. By traditional ways we harvest crops in the field of one acre in about two days but our project harvest one acre crops in five hrs. which is very efficient and time saving. In future this project is use for any type of harvesting like peanut, onion and sweet potatoes.

II. DESIGN

2.1. Components

Such development and fabrication of harvesting machine we fabricate the parts are cultivator, body frame, collecting tank and join a chain mechanism and conveyor.

2.1.1: Frame:

The frame is made of C channel of mild steel. The frame takes a rectangular shape with dimension of 125*125cm. The digger frame is carried by two tire wheels of 35cm diameter.

2.1.2: Separating unit

The separating unit is consists of a conveyor. With which has distance is 3.5*8ft as gap is between net are 2.5*2.5cm.

2.1.3 Transmission system

The transmission system works on wheel by using chain mechanism and spur gear to rotate conveyor mechanism.

2.1.4 Cultivator:

The main function of cultivator which use to digging out the soil and crops. The dimensions cultivator are 125*18cm & anchor is mounted on it.

2.1.5 Shaft

The shaft is made up of MS material having diameter of 32 mm. The diameter of the transmission shaft was Calculated according to design of shaft for transmit the power considering the bending moment, axial load, and the Torque acting on shaft.

2.1.6Wheels:

Wheels are used to support and carry the load of whole body of project. The wheels are used of diameter 350mm for reduce elevation of project from ground level & project can work properly for underground root crops.

2.1.7 Collecting Tank

The main function of collecting tank which store the material.

III. WORKING PRINCIPLE

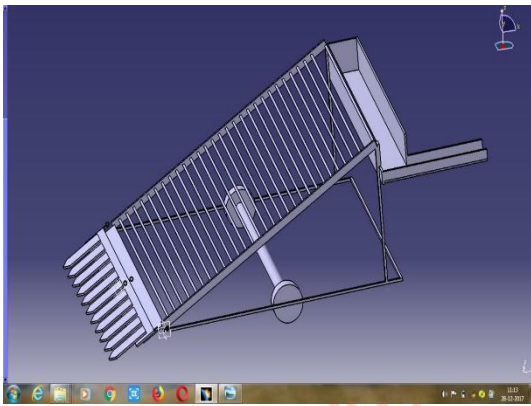


Fig-1: Catia model of Harvesting machine



Fig-2:Final assembly of Harvesting machine

This is simple mechanism can used in project. The basic concept is that power transmission from one shaft to another shaft using two sprocket and chain. The main source of power is comes from wheel which is connected to structure. Cultivator is use for digging out the underground material and pass to frame. Conveyor is connected to frame and it's rotate by using chain and sprocket mechanism. Now these material comes to conveyor and by vibration soil is remove and crops is pass to collecting tank. As slope provided to collecting tank the material is ground at the side of

IV. ADVANTAGES

1. This harvesting machine can used for harvesting varieties of underground plants.
2. Its require less time.
3. To reduce human effort and stress.
4. No Requirement of Skill Person.
5. Reduce Manpower.
6. Machine Doesn't Require High Maintance.
7. It is multicrop harvester.

V. APLLICATIONS

Unlike previous methods of harvesting this machine is a combination of various techniques/tools used for harvesting. The use of different tools are done by this machine by all alone. This machine can harvest the following crops

- Onion
- Potato
- Ginger, etc.

CONCLUSION

It is machine which separate crop from soil. The vibration reaches relative separation speed on crop. Mechanical harvesting machine is cut the crop at time 2-3 rows. Time required for harvesting crop in 1 acre is approximately 3 hrs. This harvesting machine is available at low prise as compared previous harvesting machine.

REFERENCES

- [1]. Abd-Rabou, A.F. (2004). Manufacturing a small machine to suit harvesting sugar beet under Egyptian conditions. PhD Thesis Agric. Mech. Dept. Fac. of Agric. Kafr El-Sheikh. Tanta Univ.
- [2]. El-Sherief, R.R.A. (1996). A study on harvesting mechanization of sugar beet. PhD Thesis Agric. Mech. Dept. Fac. of Agric. Kafr El-Sheikh. Tanta Univ.
- [3]. Hall, T. L., Backer, L. F. and Hofman, V. L. 2003. Sugar Beet Yield Monitoring for Site specific Farming Part II-Field Testing. Springer Science and Business Media B.V., 4 (4):433 – 444.
- [4]. PSG Design Data Book for Engineers, PSG College of Technology, Coimbatore. ISBN 978-81-927355-0-4
- [5]. Van Canneyt, T. and Verschoore, R. 2000. Yield Measurements on a Potato Harvester. (00-PA-020) *Agri. Eng., Warwick 2000*.
- [6]. Walter, J. D. and Backer, L. F. 2003. Sugar Beet Yield Monitoring for Site-specific Farm-ing Part I. Laboratory Tests and Preliminary Field Tests. *Springer Science and Business Media B. V.*,4(4): 421 – 431.
- [7]. Walter, J. D., Backer, L. F., Hofman, V. L. and Scherer, T. F. 1996. *Sugar Beet Yield Monitoring for Site Specific Farming*. ASAE Paper No. 96- 1022, ASAE, St. Joseph, MI.

