



Portable Electric Power Tiller Machine

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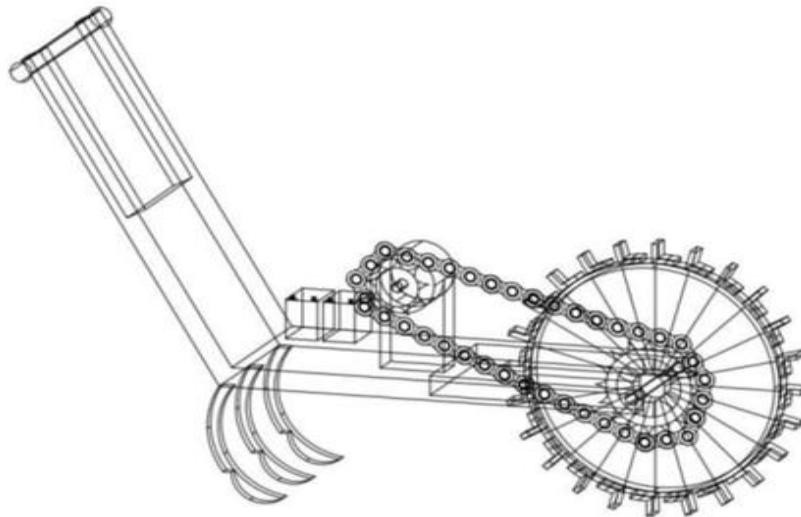
ABSTRACT : Agriculture starts from human existence. It is important part in human life as it feed us and thereby it runs the ecosystem though. It is extreme important section for living beings. But modern farming techniques are heavy-coughed and very intensive. Modern tractors which runs by fuel are detrimental to environment and not affordable to farmers. Tilling in farming is main step and traditional techniques were time consuming and very intensive and modern ones are non-affordable and hazardous to environment. Portable Electric power tiller machine uses battery-powered mechanism to serve the tilling purpose at minimum cost, time in tilling and thereby increasing productivity, efficiency to enhance healthy environmental purpose too.

KEYWORDS: Electric Tiller machine, motor, portable, mini tractor, frame design, vibration and traction effort.

I. INTRODUCTION:

India being farming major, the need for modern technologies in agriculture routines is undisputed. Power tiller are engine operated low power machine used for bed preparation. They are compact, handy and medium duty machine. Currently, power tiller of capacity 8 hp-10 hp and weighting up to 350 kg are widely manufactured across the country. The power tiller

presented in this project is a 3.5 hp power tiller specializing in weeding operation, suitable for black soil of sugarcane cultivation. This project deals with design and development of Chain and Sprockets, Shafts, Belt Drives, Bearing, Transmission Case and Chassis etc. to change the engine speed to tilting speed of the Power Tiller. This machine is specifically for sugarcane cultivation requirement and can be used for black moist silted soil. The trials performed showed considerable saving due to use of power tiller over men. At present, most of the power tiller manufactured in the country are in the range of 8-10 hp and weight about 350 kg. The power tillers are not potentially used in hilly areas due to the lack of its maneuverability on slopes. This is primarily due to its heavy weight, which needs to be optimized further Therefore it is felt necessary to develop a lightweight power tiller fitted with 2-4 hp engines. Considering all these factors, and as a small effort towards mechanizing agriculture and helping the 60% Indian population who depend on agriculture for their livelihood and to encourage their share in developing our economy. This power tiller that we present here in this report is meant for operation of weeding in sugarcane farms with minimum inter row distance of 1.2 meters. This machine is easy to operate, cheap, portable and simple in construction and maintenance with easily available source.



LINE DIAGRAM OF MACHINE

SUMMARY : This paper's primary goal is to design and construct a ploughing machine for use in soil cultivation. Our goal is to decrease the amount of labor needed to operate the plough. The only option is to automate it, but we are unable to automate it owing to a few limitations, such as the need for electricity, which is not always available in rural areas, and for microprocessors and sensors, both of which add to the cost and may require technical expertise to operate. The answer we came up with was to use engines, motors, and power transmission equipment to semi-automate it rather than fully automate it.

II. LITERATURE REVIEW :

Prof Prashant Rahat et al (2021) published in International Journal of Advanced Research in Science, communication and technology (IJARSCT). Design “portable electric

power tiller machine” In this paper researcher studied the portable battery charged electric power tiller machine. Farming practises used in traditional agriculture. To provide maximum soil grip, the machine uses a wheel with welded angles. The wheel design was created to offer a strong grip on the soil that would allow the cultivator prongs to drag during the tilling process. An electric motor drives the pulling wheel through a sprocket chain arrangement. By adopting a motorised tilling system, it minimises human effort at a very low

cost. Using a unique portable design, the electric power tiller reduces the time and cost of tilling, enhancing agricultural output and efficiency. Shabbir J. Karjatwala et al (March 2018) published in open access international journal of science and engineering Design development and fabrication of mini cultivator and tiller. In this paper researcher studies Farmers used to use traditional farming methods, which are time-consuming, labour-intensive, and expensive, therefore they introduced new technologies. Machines are commonly employed for farming purposes in India, which is at a higher level. They are creating this model in order to solve this challenge. This document discusses the operating machinery that would be used to till one and a half hectares. With this new technology, the plough will be able to go ahead and the base wheel will rotate with blades that provide traction.

WORKING : The machine works on a DC motor which gives power to the overall system to run the object. The machine is driven by a DC motor which is in contact with the chain drive which ultimately helps to run the working wheels of the tiller during operation. For the tiller machine, the neat and accurate modification of the supporting frame is provided. For the tiller machine, the neat and accurate modification of the supporting frame is provided which gives an output voltage of fixed proposition. It is in such a way that magnitude remains constant and input voltage doesn't change for conditions of voltage. The regulator is connected to the main wire which is connected to the switch.



The regulator and wire are connected to the motor to run the operation. The motor is fitted to a suitable angle as per stability for a worker during operation. Wheels are provided for ease in working during agriculture.

OPERATION : A motorised tiller is operated by walking behind the machine. The machine consists of electric motor, battery, chain sprocket, wheel angles, bearing, electrical & wiring, mounts and joints, supporting frames, screw and fitting, bicycle wheel, the machine is powered by an electric motor that drives the pulling wheel using a sprocket chain configuration. The motor that drives the forks into the soil is powered by a battery. The cultivator forks enable for precise and easy tilling, as required by farming. The machine is light in weight and portable. Due to easy construction of machine the maintenance is very low.

ADVANTAGEOUS :

- 1) Portable and easy to operate.
- 2) Cost- effective as compared to a tractor.
- 3) Replacement for animal power and human effort.
- 4) Simple in design.
- 5) Easy to maintain.
- 6) Cheap in cost.
- 7) Pollution free.
- 8) Eco-friendly.
- 9) User friendly.
- 10) It has low running cost.
- 11) Automatic operation.
- 12) Battery power no fuel needed.

DISADVANTAGEOUS:

- 1) Needs charging when battery runs out .
- 2) Clean after every use.

APPLICATIONS :

- 1) In agriculture field for preparation for seed sowing
- 2) For ploughing.
- 3) Weed removal.
- 4) For softening land .
- 5) For harvesting small crops .
- 6) For cultivation of soil .
- 7) Soil preparation for seed sowing .
- 8) Crop cutting .
- 9) Unwanted grass cutting .
- 10) A number common wedding tools are Desinged to ease the task of removing

CONCLUSION : The portable motor operated tiller machine is capable of primary and secondary tillage operations and is most suitable for operations in hilly regions, wet conditions, and small holdings.

Given the right set of implements and attachments, the portable motor operated tiller machine is capable of performing most of the field operations in intensive cultivation. The lightweight of portable motor-operated tiller machine is a favorable factor for working in wet and dry land conditions. External attachments can be made on the tiller depending upon the nature of the work. So, the tiller can be used as a multi-purpose machine.



ASSEMBLED PROJECT MODEL

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