

DESIGN AND FABRICATION OF PORTABLE ONION HARVESTER

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ABSTRACT:

Agriculture plays an important role in the economy by providing health to many people around the world. Onion is an important component of many diets and is an important crop grown worldwide. Onion harvesting is a very laborious job and an efficient and effective harvest is needed. This article describes the design and construction of an onion harvester designed to solve problems associated with the harvesting process. The harvest strategy is designed to increase planting efficiency, reduce labor and increase overall profitability.

1. INTRODUCTION:

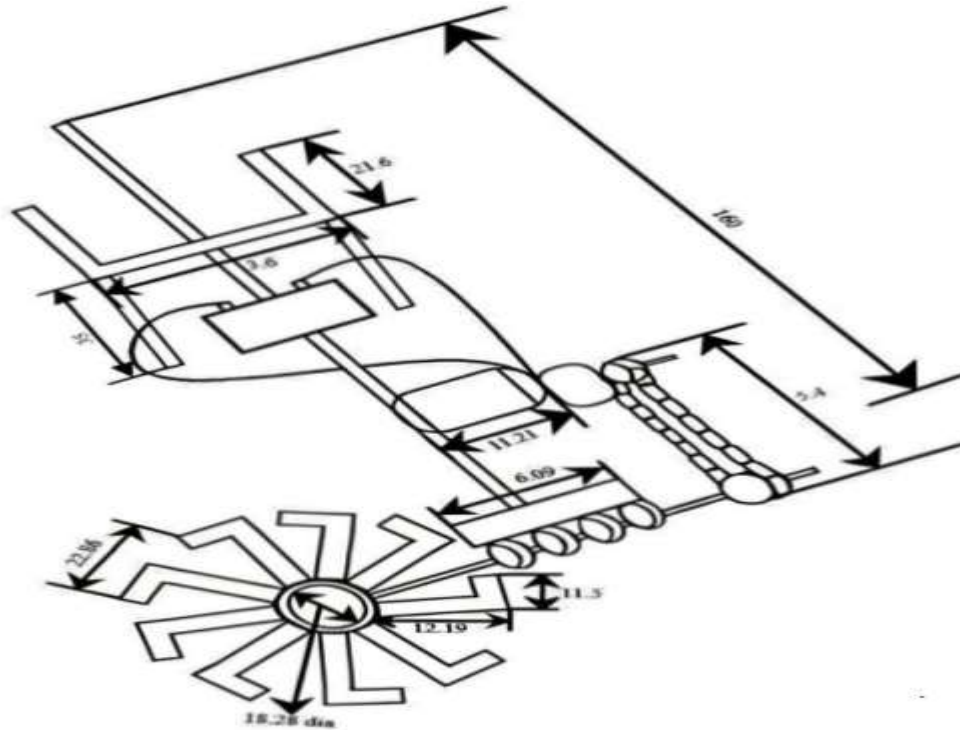
Cultivation is an important part of agriculture, and the harvesting process causes problems in terms of labor and time. This article describes an onion lifting machine designed to solve these problems by combining new materials and equipment, providing good results and solutions.

2. DESIGN CONCEPT:

The design of the portable onion harvester includes important features that will make it more efficient. These features include adjustable cutting height, conveyor system for collecting and transporting harvested onions, and a durable yet portable power system. This combine harvester is designed for easy use in the field and ensures minimal damage to crops during harvest.

DESIGN CONSIDERATION

3.

**METHODOLOGY:**

The methodology involves the selection of materials and the fabrication of specific components to achieve the desired functionality of the portable onion harvester. The key components include the frame, motor, battery, chain drive, shaft, metal strip, and disc.

Frame: The frame is fabricated using lightweight yet durable materials to ensure portability and structural integrity.

1. Product selection:

Material Issues: The use of lightweight materials such as aluminum alloys or high-strength polymers is important to reduce the overall weight of the cutter. This option makes it easier to operate and transport from different locations.

Durability: Even if heavy, the selected materials must have high performance to withstand the weight of the land. This includes corrosion protection, impact and environmental factors.

2. Design:

Robustness: The design of the frame focuses on providing sufficient rigidity to ensure stability during operation. This prevents excessive vibration and ensures a stable position.

Modular Structure: Modular structure provides easy assembly, disassembly and maintenance. This modularity can also be adjusted to the needs of a particular location.

3. Portability Features:

Folding Mechanism: The frame can be folded for better mobility, allowing the mower to be transported between fields and storage areas.

Joints or wheels: Ergonomic features such as joints or wheels are integrated into the design, making it easier for the operator to move the product in the field.

4. Attachment points:

Safety Attachment: Correct attachment points and attachment methods are important to maintain the structural integrity of the frame during operation. Various bolts, nuts and welding techniques to ensure stability and reliability.

5. Adjustability:

Adjustable components: The frame design will include adjustable components to accommodate changes in field topography and onion crop height. This variation shows the performance in different farming situations.

6. Safety Notes:

Worker Protection: Safety features such as guards or shields are incorporated into the design to ensure user safety while working. These guards prevent contact with moving objects.

7. Manufacturability:

Cost-Effective Manufacturing: The frame is designed with ease of manufacturability in mind and helps improve the overall costs of the portable onion harvester by simplifying production costs.

Motor: A suitable motor is selected to drive the cutting mechanism efficiently.

Engine selection:

Efficiency: The selected engines have been carefully selected to provide high performance to ensure good use of energy during operation.

Power Output: The power output of the motor matches the requirements of the cutting machine, providing enough power to cut the soil and harvest the onions well.

Compact Design: The aim is to choose an engine with a compact design to ensure it integrates seamlessly into the overall structure of the combine without affecting its portability.

Drive Mechanism:

Smooth Transmission: The engine is placed on a reliable drive mechanism to ensure that the power is transmitted to the cutting. This improves the overall performance of the clipper and reduces energy waste.

ADJUSTABLE SPEED: The speed of the engine is adjustable, providing flexibility to the operator according to certain conditions and harvest.

Energy:

Battery or gasoline engine: The cutter is designed to fit behind a battery or a small gas engine to power the body. This versatility can adapt to different customers and environmental considerations.

Durability and Longevity:

Robust Construction: The selected engines have a solid construction that allows them to last even when exposed to the rigors of agricultural terrain. .

Maintenance Notes : Motors have been selected with ease of maintenance in mind, ensuring ease of maintenance and replacement when necessary throughout the life of the cutting machine.

Operating Controls:

User-Friendly Controls: The engine is equipped with user-friendly controls that enable the operator to type to maintain good operation. This includes features like keyboards and speed controls.

Chain Drive: A reliable chain drive system is implemented to transmit power from the motor to the cutting mechanism.

The portable onion harvester incorporates a dependable chain drive system to efficiently transfer power from the motor to the cutting mechanism. This ensures a reliable and smooth operation during the onion harvesting process.

Shaft: The shaft serves as a critical component for the transmission of rotational motion to the cutting blades.

The shaft in the portable onion harvester plays a crucial role by serving as a vital component for transmitting rotational motion to the cutting blades. This ensures precision and effectiveness in the harvesting process, contributing to the overall efficiency of the machine.

Metal Strip: A circular metal strip is employed as part of the cutting mechanism, ensuring precision in onion harvesting.

Using round wire in cutting tools during onion harvesting is an important factor in the production of onion harvesting. These elements are coordinated to ensure accuracy during harvest. The round metal stems are clean, cut accurately, reducing damage to the bulbs and optimizing the overall efficiency of the plant. Its design reflects a commitment to efficient and effective harvesting, helping to improve crop quality and farmer productivity.

Disc: The disc is utilized to control cutting height and optimize the harvesting process.

Discs on portable onion harvesters play an important role in controlling the cutting height and optimizing the entire harvesting process. It is located within the disc mechanism and allows the cutting height to be adjusted, adapting to different conditions and onion size.

The importance of scratch disk includes:

1. **Cutting Height Control:** This disc is designed to allow the operator to efficiently cut cutting material for specific crops by controlling the depth at which the cutter operates.

2. **Precision Harvesting:** The cutting machine uses discs to adjust the cutting height, ensuring precise and even cutting of the onion crop. This feature minimizes waste and increases the consistency of collections.

3. **Adaptability to field conditions:** The adaptability of the discs allows the combine harvester to work well on different terrains and soil types. It can be adjusted according to changes in the field to achieve the best performance in different agricultural fields.

4. **Optimization of the harvesting process:** Thanks to the use of controlled products, the harvester optimizes the entire harvesting process. This includes increasing performance, reducing energy consumption and improving the operator's ability to use the machine in the onion field.

5. **Minimize crop damage:** The disc's role in cutting height helps prevent unnecessary damage to corms. This ensures that the crop remains clean and productive while maintaining the quality of the crop.

The working principle of the design and production of the portable onion harvester revolves around a systematic process that reduces effort while harvesting onions well. The main details of how it works include the following steps:

4. WORKING PRINCIPLE:

1. Operator's guidance:

The operator easily picks the onions from the onion field, puts them in the hole to get good results.

2. Engine Starting:

Engine is an important part of the clipper and it operates the clipper. The engine is the power that drives the entire business.

3. Chain Drive Integration:

Reinforced chain link that transfers power from the body to the cutting machine. This ensures the energy is consistent and effective.

4. Rotation of the shaft:

The shaft is another important part that transmits the rotation produced by the engine to the cutting blade. This propagation is easy to transport, simply cutting it from the soil and picking the bulbs.

5. Round Wire Strip Cutter:

Replace the wire strips integrated in the cutting process to play an important role in cutting the onion cleanly from the ground. These products ensure the accuracy of the cutting process and help improve the overall results of onion picking.

6. Cutting Height Control Dial:

This dial is used to control the cutting height and allows the operator to adjust the depth of the cutting blade. This feature provides flexibility and adaptability to different field conditions and bulb sizes.

7. Conveyor System:

At the same time, the conveyor system is activated to collect and transport the harvested onions. The system facilitates the smooth transfer of onions from the cutting area to the storage area.

8. Operator control:

The operator controls the cutting speed, cutting height and direction of the crop; this provides the opportunity to vary differences between regions and onion crops.

9. Harvest Quality:

The combination of cutting machines, disk management and conveyor equipment ensures a good onion harvest, reduces the need for labor and ensures the efficiency of all products.

5. MARKETING POTENTIAL:

The market potential of portable onions is huge, thanks to their features and advantages:

1. Costs:

Combine harvesters provide great benefits by reducing accounting-related labor costs. This economic advantage attracts farmers who are looking for better and cheaper products.

2. Efficiency:

With its innovative design and technology, this harvester increases onion harvest efficiency. Reducing time and labor, it will be a good choice for farmers to improve their business.

3. Adaptability to different types of terrain:

The author's versatility in using different types of terrain adds to its appeal. Farmers working in different types of agriculture can benefit from its flexibility, making it a profitable investment in many fields of agriculture.

4. Portability:

An important aspect of mobility to meet the needs of farmers of different sizes. The crop is easy to transport and can be effectively used in small and large plantings, thus expanding its economic scope.

5. Accessibility:

Accessibility of combine harvesters to farmers can help increase the value of crops. Its user-friendly design and ease of use make it a good choice for farmers with different levels of expertise.

6. Market Opportunities:

Combine harvesters have the opportunity to enter the market due to their unique selling point. As awareness of the benefits of onion cultivation continues to grow, harvesters are expected to become a popular tool in the agricultural sector.

7. Permaculture:

Harvesters meet the needs of permaculture. Its efficiency and reduced reliance on manual labor help permaculture attract farmers and consumers.

8. Positive economic impact:

Adoption of onion harvesting can have a positive impact on farmers' health. Greater efficiency and savings mean greater profits, making harvesters an attractive business.

6. BENEFITS:

1. Affordable:

Combine harvesters offer farmers a great alternative to harvesting by reducing labor costs. This business advantage increases overall performance and profitability.

2. Precision with round metal band:

Use of round metal band in cutting for precision in onion picking. This feature reduces crop loss and improves crop quality, meeting high standards in agriculture.

3. Adapts to all types of terrain:

The author's design allows uninterrupted operation on different types of terrain. Its adaptability ensures consistent performance, making it a versatile solution for farmers who encounter different soils in their fields.

4. Reduce harvest time:

By automating the harvesting process, the harvester significantly reduces the time required to harvest onions. This time savings allows farmers to optimize their operations, thus increasing productivity and efficiency.

5. Harvest quality:

The production of crops is not limited to onions, it can also increase its efficiency in harvesting various tuber crops. This versatility expands its many uses, making it useful for farmers growing a variety of root vegetables.

7. UNIQUENESS OF OUR MACHINE:

The uniqueness of our machine lies in its:

1. Value Advantage:

Shows the economic advantage of your machine over your competitors. Highlight cost-saving innovations or useful designs that make it affordable.

2. Round Metal Strip Cutting Mechanism:

Describe how this cutting mechanism makes your machine unique. Discuss the advantages of using round metal strip over other cutting methods, such as accuracy, durability, or efficiency.

3. Suitable for all types of soil:

Underlines the versatility of the machine by showing its adaptability to different soil types. Sand, clay, loam etc. Discuss how he/she copes with different circumstances such as; This makes it a versatile option for farmers with different fields.

4. Efficiency:

Explain how your machine can improve the harvesting process in terms of operating hours. Discuss special features or techniques that make harvesting faster compared to traditional methods.

5. Efficient harvest of various tuber crops:

Specify the variety of tuber crops your machine is designed to achieve good results. Describe the design or modification that makes it useful in various tuber plant species. This includes potatoes, sweet potatoes, yams, etc. is included.

8. TECHNOLOGY USED:

The portable onion harvester incorporates state-of-the-art technology in its design, utilizing a battery-powered motor, chain drive system, and a circular metal strip cutting mechanism. These technological advancements contribute to the overall efficiency and effectiveness of the harvester.

1. Battery Powered Motors:

Shows the advantages of using a battery powered motor. This can include reduced environmental impact, lower operating costs compared to traditional gas-powered equipment, and the ability to improve mobility and ease of use.

2. Chain Drive System:

Explain how the chain drive system works in a chain saw. Discuss its durability, accuracy, and other unique features in the operation and maintenance of the machine.

3. Circular Wire Strip Cutting Mechanism:

Detailed explanation of the benefits of the metal strip cutting mechanism. This can include better accuracy, less wear and better onion harvest. Explain why this mechanism is superior to other cutting methods commonly used in onion harvesters.

4. Overall Productivity and Efficiency:

Tie the use of this technology to the overall performance and efficiency of the cutting machine. Discuss how the combination of battery-powered motor, chain drive, and circular saw blade makes the machine more efficient than other methods of speed, exposure, and resource use.

Consider providing details or specifications to add depth to the description of the equipment. Additionally, if your lawn mower has smart or automation features, highlight these features and highlight the superior performance of the machine.

CONCLUSION :

As a result, the design and manufacturing of portable onion harvesters is an important step in solving the problems farmers face during harvest. The combination of special features such as battery motor, chain drive mechanism and integrated metal structure demonstrates commitment to high performance, user-friendliness and good price. The impact of this cutter goes beyond simplicity. It is expected to increase the sustainability and profitability of onion farming. This innovation adapts to the changing nature of today's agriculture by making harvesting easier and providing flexibility for different soil types. Being aware that efficiency is important, field tests and practical ideas will play an important role in the development of the design. This improvement allows the portable onion to not only meet, but exceed the expectations of those

who rely on it in a variety of agricultural environments. As we hope, the collaboration between technology and agriculture will continue to make advances that empower farmers and contribute to the recycling and efficiency of agriculture. The portable onion harvester unlocks the potential for creative thinking and innovation to solve real-world problems faced by people on the front lines of food production.

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