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VACCUM GRAIN COLLECTOR BAGGING AND WEIGHING MACHINE

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ABSTRACT

In mills and agricultural fields grains are collected by means of number of labors and more time consumption. In order to limit the time and work wages a simple mechanical heaping machine is been constructed to handle with less labors. The main objective of this project is to heap the paddy and also to clean the garden in an effective manner with simple adjustments and less remuneration. In this machine the driving shaft of the wheel is welded with sprockets on either side of the shaft. Grain collecting machines it is operated fully in a mechanical means. In modern grain handling machines, the grains are collected by means of vacuum suction and it requires external power supply.

Keywords: Fabrication, Grain, Collecting machine, harvest losses.

INTRODUCTION

We all know that Agriculture is the back bone of India. In this modern world however the technologies are improved and new modes of business types has emerged Agriculture has its own forms of development through evolution of new machineries and new varieties of crop yield is been employed. Industrial Revolution and the development of more complicated machines, farming methods took a great leap forward Instead of harvesting by hand with a sharp blade, wheeled machines cut a continuous swath. Instead of threshing the grain by beating it with objects such as rods, threshing machines separated the seeds from the heads and stalks [1]

By following this process, the grains are being collected and dried by means of large number of labors. In order to cut short, the labor usages and to reduce time consumptions, manually operated heaping machine is employed in order to reduce the labor usage and reduce time consumption.

Separating the grains from the soil and collecting them from the ground and in the groove of the land by hand and by holders is a hard work and time consuming to that is not precisely done. Hence the need for a machine to collect the grains in the field has been identified. The development of a growing population increases the need of food day by day. There are several solutions to increase the production of cereals.[3]

This study aims to determine the exact losses grains that are wasted on the ground and loss in the operation of harvesting and design and evaluate a collector capable of collecting the grains shattered in the field due to harvesting [3]

This project aims to design and fabrication of collecting and storing of grains by manually. Main objective behind designing and fabricating the bagging and collecting of grains is to reduce the human effort and also reduce time taken for storing. This project mainly helpful to the former the

problems faced by small scale farmers relating with availability of labors and cost of collecting and storing finally It is also capable of reducing time wastage, reduction in breakage of the grains. Problems faced by small scale farmers relating with availability of labors and cost of collecting. [2]

PROBLEM STATEMENT

Now a days the cost of production of various food grains increasing due to several factors. Since only 2 persons can work at time which makes slow work progress 100% effective output result cannot be obtained. Each and every day the prices of labour cost keep on fluctuating. They increase with higher rate but never fall down. By collecting the grains from labour, it takes a more time. Each person to lift a weight of about 50 kg bag loading stand food needs 3-6 times lower operational efficiency, labour intensive, and sometimes encounter with rainy weather, the food collection will not be timely completed in such situations. So basically, there is need to design new equipment. Small and effective machines are to be developed by which manual labor can be replaced effectively. Also the time required for processing reduces. Production cost can be controlled and reduced by use of such machines.

OBJECTIVE

A vacuum grain collecting, bagging and weighing machine will be developed with major list of objectives are as follows: -

1. To fabricate and assemble the designed grain collector.
2. To fabricate a machine which can collect, bag and weigh the food grain simultaneously at a time.
3. The machine has a simple construction and is light in weight which makes it easy to handle.
4. To minimize manpower and reduce the hard work.
5. To minimize the time for collecting.
6. Machine can be easily movable or portable using wheels.
7. To fabricate a machine with no damage or breakage of grain particles.
8. To fabricate a machine with no pollution at all.

SCOPE

1. Installing few components such as Roots Blower, Gate Valve and Delivery pipe to the existing system, it can be used to transfer grain from one place to another place for further processing in seed cleaning facilities.

2. By adjusting discharge height of cyclone and placing high pressure centrifugal blower, it can be used to load the food grains to vehicle in Market yards.

METHODOLOGY

This study/project would be consisting of following chronological step of working:

1. Literature study.
2. Project identification.
3. Identification of equipment.
4. Design of Components.
5. Material selection and final concept.
6. Fabrication.
7. Conclusion

CONSTRUCTION

A vacuum air pump will be used for suction purpose. The vacuum air pump will create vacuum pressure which help to suck the food grains and deliver it to the packing

Hoses are used to carry fluids through air or fluid environments, and they are typically used with clamps, spigots, flanges, and nozzles to control fluid flow. It is used to transfer the grains from suction to packing bags.

Use of Air Filter in the suction line prevents sand particles to enter the main blower. Use a combination of net, metal sheet and cloth piece as filter. It maintains the longevity of the machine

Wheels are used to mobile the machine from one place to another place

A portable weighing machine is used to measure the weight of the packing bags with grains

DESIGN

Design depends on the following parameters: -

1. Inlet & Outlet Pressure: The effectiveness of the component comes with equal positive and negative pressure. Material suction and throw becomes more effective with right pressure.
2. Measuring CFM: Cubic Feet per Minute are a measure of the volume through which the material passes through. Blower CFM is the measure of air flow occurring within the blower. Higher the pressure, the more the gasses will be compressed and therefore higher will be the CFM.
3. Impeller Design: These are rotating blades through which air passes. K.E. of Impeller increases due to Pressure increases of air. Higher rotating speed = more pressure of blower
4. Weight and Durability of Blower: The weight was considered to be heavy and bulky. Light weight material is considered as a part of it.

Design of Suction head

Available data

1. Blower motor capacity: Around 1400w with 2800 rpm
2. Blower vacuum pressure: 0.0294 bar
3. CFM: 60 [3 /min]
4. Pickup grain: grain density max up to 2.5 $g/cm3$
5. Suction pipe diameter:- 35/40

ADVANTAGE

1. Manually operated , no fuel and electricity
2. Easy to operate
3. No required the professional operate
4. Less maintenance[1]

DISADVANTAGE

1. Not suitable for materials other than food grains
2. The filter needs to change after six month of period

CONCLUSION

From the calculation and analysis we can conclude that, our system can contribute to solve the need to find the sustainable solution to the labour workforce to increase productivity and to facilitate heavy work in agricultural activities such as handling heavy crops and load bags, and delivering and transporting in shared environment. In terms of health and safety in agriculture, most accidents are caused by collisions and human errors. In this context, our system can be used to mitigate the accident causes. In agricultural environment, several approaches already been implemented. However; In particular, the flexibility and adaptability of this technique give potential to increase productivity and generate a positive economic impact in the near future.
There is no such a device currently present in the market at such a cost which can handle three things at a time i.e. suction, packing and weighing of food grains, so launch of such a project and device will surely create a market boom. This project is totally dedicated to solve the problem o food wastage in Indian due to lack of food grain handling technology and one day there will be no more food waste in India due to handling technology.

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