

A REVIEW ON DESIGN OF PEELING-SHELLING COMPACT COMBO MACHINE

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Abstract: *This paper is an attempt to focus mainly on reduction of human efforts and on time saving owing to minimum manufacturing cost. This paper also focuses on simplified design of corn peeling and shelling combo machine which helps to all farmers, industrialist to minimize cost and rate of manufacturing of corn seeds and also the attempt is to make a machine which is compact in size.*

Keywords: Maize, Peel, Shell, Compact

1. INTRODUCTION:

In today's industrial world man's innovative ideas has brought him towards all the directions concerning about the production as well as safety in industrial establishments. Some instruments are of sheer excellence where as others are the result of long research and persistent work, but it is not the amount of time and money spends in the invention of device or the sophistication of it operation is important, but its convenience, utility and operational efficiency that are important in considering the device.



Fig - 1 Maize Or Corn

India is presently in need of technology in the agricultural field. The farmers need to do all the segregating processes manually which is a cumbersome task for them and also this increases the cost of the final products.

Here we have introduced a device which is based on scientific principles of machines. It is simple, cheap and maintenance free that is produced as result of this project work.

The existing methods of corn husking in agriculture industry consist of breaking the grains by hand which is totally manually, which is not effective and as well as time consuming. As far as cost aspects are concerned the deseeding machine serves much cheaper as compared to human labor. The operating of the device is low as it requires only single person to operate as compared to manual method. Its maintenance cost is almost negligible as it require only periodic lubrication. Basically there are machines for De seeding the corns but they are costlier enough so that small scale farmers can't afford it. To overcome this, we thought of a machine for the same purpose with minimum cost as far as possible. This Machine with the rotating rollers removes the corn through the shearing action between the Maize spikes and Maize casing and prior to that it also peels off the shell of the maize very neatly so that there is no damage done to the corn seeds inside it.

1.1 Advantages:

1. The machine is in compact size.
2. The power consumption is low.
3. Less time consuming.
4. Maintenance cost is less.
5. High Production in less time (Capacity 100 to 150 kg per Hr)
6. Any size of corn can be De-seeded.
7. Simple in Design and Fabrication.
8. No need of any safety device.
9. Benefit for small and medium scale farmers.
10. The machine is also used as "Mould Breaking Machine".
11. There is no damage of the corn grains.

1.2 Disadvantages:

1. Only dry corn can be de-seeded.
2. Continuous power supply.

1.3 Applications:

1. Used in agricultural field.
2. Used in starch industry.
3. The device can be very helpful to small scale farmers and domestic purpose.
4. This machine can also be used as Mould breaking machine.

2. RELEVANCE:

The objective of project to develop a machine which helps to reduce the human effort and cost of the machine and also suitable for small scale industries. Simple machine construction and better features developing a machine in compact size which peels the shells of the corn and also deseeds the corn in less time. By certain arrangements the whole unit can be made easily portable. Maize the American Indian word for corn, after wheat and rice, the most important cereal grain in the world which provides nutrients for humans as well as animals and serve as a basic raw material for the production of starch, oil and protein, alcoholic beverages, food sweeteners and more recently fuel. In Africa, it is used in various forms to alleviate hunger, and such forms include pap, maize flour, and etc. The major steps involved in the processing of maize are harvesting, drying, de-husking, shelling, storing, and milling. For the rural farmers the appropriate technology suites their needs must be used to maximize profit from their maize. The processing of agricultural products like maize into quality forms not only prolongs the useful life of these products, but also increases the net profit of farmers by using mechanization technologies. One of the most important processing operations done to bring out the quality of maize is peeling, shelling or threshing of maize.

3. LITERATURE REVIEW:

3.1 Girish Karikatti et al^[1] This paper focuses on a “Crank Operated Maize Sheller” using ergonomic and mechanical considerations for dehusking and shelling. dehusking is a tedious and separate activity that precedes shelling that brings additional burden on farmers. It consists of feeder from where the maize is inserted. The crank is connected to the blade. When the crank is turned, the blade rotates and shells the maize. The machine is operated by 1 person and requires feeding of cobs one by one.

3.2 S. B. Patil et al^[2] This paper focuses on a pedal operated maize Sheller design, developed and built by using locally available material with overall dimensions of 1270×760×1150 mm. It works for longer time continuously with high rate of shelling without damaging to Kernels. Shelling efficiency was obtained 98 percent with 94 percent collection efficiency and average rate throughout of 150 kg/hr.

3.3 Earl Milton Ladd et al^[3] This paper focuses on the primary function of the pickup conveyor which is to remove the whole and partial ears of corn from the ground and place them on the combine header. Through field testing, it was found that to adapt to different operating conditions, the pickup conveyor should be versatile.

3.4 Anant J. Ghadi et al^[4] This paper focuses on the existing methods of corn de-husking in agriculture industry consist of using large machinery for deseeding breaking the grains by hand or, both of which are not effective and are time consuming. Hence there is a need for an innovative idea or product that is feasible, safe, cost effective and productive for the farmers. Hence it is necessary to design and develop a low cost corn deseeding machine.

3.5 Adewole, C. A. et al^[5] This research work evaluates some locally fabricated maize shelling machines. The shelling efficiency ranged between 85.9 and 89.7 % with an average value of 88 %. The throughput capacity ranged from 318.4 kg/h to 400 kg/h with an average value of 360.8 kg/h. The problems faced by machine operators includes corrosion of machine parts, separation of kernels from cobs after shelling, packaging of kernels and cobs into bags after shelling and flying over of maize cobs during shelling.

3.6 Anirudha G. Darudkar et al^[6] This review mainly focuses on various sources to increase the income of farmers. The average kernel price is approximately twice the price of cob. Hence, more income can be generated by farmers if cobs are shelled and kernels are sold by themselves in the market. But to make this possible it requires a cheap, manually operated and efficient corn Sheller. A study on design, fabrication, and performance of a corn Sheller is done so as to evaluate the performance of the machine in terms of throughput capacity, shelling\ efficiency, material efficiency and mechanical damage.

3.7 Praveen Kiran Mali¹ et al^[7] This literature report is review on human powered machine, the survey proved to system which shows cost effective and functional viable. There are many maize threshing techniques which are used in our life. The main problems with these machines are that they are not affordable to farmers who are having acreage farms. So these farmers resort hand operated tools which gives low output, more damages of kernel threshed from cob, which is monotonous work. These machines are automatic operated, fuel operated which provides simple mechanical design.

3.8 D.O Aremu et al^[8] The paper focuses on design, fabrication and performance evaluation of a motorized Maize shelling machine. The performance evaluation was carried out using the NIS standard. Result showed that shelling efficiency, cleaning efficiency, grain recovery efficiency and output capacity were 87.08%, 95.89% and 623.99kg/hr respectively which were at highest values at 13% moisture contents of maize and at 886rpm shelling speed which results in high efficiency.

3.9 Oriaku E.C et al^[9] The research paper emphasis on the design and performance evaluation of corn de-cobbing and threshing machine. Corn at moisture content of 15.14% db sourced locally was used in the experiment and the data collected were analyzed. Results showed that for a total 20kg of sample tested, the average feed and threshing time were 2.37 and 2.95 minutes respectively. The average feed and threshing rates were 2.06 and 1.65 kg/min with an average threshing efficiency of 78.93 %. The average separation efficiency was 56.06 %.

3.10 Concluding remark from literature review:

This shows that many authors have reported the corn sheller and peeling design and also analyzed it for different loading conditions. Now the corn peeling and sheller machines are separately available, but there is no single unit exists consisting of both the mechanisms.

4. PROPOSED WORK:

The proposed work aims to develop a machine which helps to reduce the human effort and cost of the machine and also suitable for small scale industries. Simple machine construction and better features developing a machine in compact size which peels the shells of the corn and also deseed the corn in less time.

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