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A Review on Design of Multi–purpose Cutting Machine for Agricultural Uses

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Abstract: India is an agricultural country. In which 65% people are farmers. As, the population of india is increased, the demand of food is also increasing.

In these circumstances, we need a fast cutting process instead of traditional cutting methods. In the past, agricultural activities were carried out with manual force. But today in most of our country there is a shortage of manpower; therefore labor is not available when required. So the labour cost for cutting of sugarcanes seed, groundnut and straw cutting only skilled labours are required.

To minimize the labour cost and to get work done in minimum, time at cheap cost this machine is designed. It is simple in construction. It does not need skilled labour

Keywords: Sugarcane Seed Cutting, Groundnut Stripper, Straw Cutting.

I. INTRODUCTION

Agriculture is one of the most important sectors of the Indian economy. Agriculture is the only livelihood for nearly two thirds of Indian workers. The Indian agricultural sector has occupied 43% of the geographic area of India and is contributing to 16.1% of India's GDP.

In India, agriculture has faced serious problems challenges such as agricultural labor shortages, not only during the peak working season, but also in normal time. This is mainly due to the increase in non-farm employment opportunities with more wages, labor migration to cities and low status of agricultural work in society. On the other hand, arable land is decreasing due to urbanization. Agricultural mechanization is one way to overcome this problem. Fortunately, there are many opportunities to advance agricultural mechanization.

The main agriculture products in India are groundnut, sugarcane and wheat. Some of these agriculture products are explained below.

A. Sugarcane

India is one of the largest sugar cane producers in the world, producing around 300 million tons of cane per year. For the sugar cane plantation, the sugar cane seed has to be planted in moist soil. This sugar cane seed is nothing more than a part of the sugar cane. Sugar cane has about 15-18 seeds. In a traditional way, the peasants cut the entire sugar cane 5-6 parts, so that each part has 2-3 seeds. Then those cut off parts are planted to the ground. About 4 million sugar cane growers and a large number of agricultural workers are devoted to the cultivation of sugar cane and auxiliary activities, constituting 7.5% of the rural population workforce.

B. Straw Cutting

The straw is remains part of the maize plant and Jowar, after removing the maize part. Farmers used to cut this straw and use these cut parts as pet food such as buffalo, cows, oxen and goats, etc. Initially this straw is about 150-200cm. And this needs to be cut in small pieces.

C. Groundnut

Groundnut is one of the most important agricultural products in India. Peasant use for manually separate the groundnut from their plants. This requires more manpower like 20-30 toil per acre, and that too is a time-consuming operation. A single peanut plant contains 20 to 30 groundnut.

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II. OBJECTIVE

Aim of our project is to design & fabrication of multi -purpose cutting machine for agriculture uses which will help farmer to reduce human efforts and reduce cost of production.

Which will be available to them at low cost.

1) To reduce labour efforts.
2) To increase profit.
3) To reduce time.
4) By using modern cultivation progress agriculture.
5) To reduce labour cost.

III. METHODOLOGY

A. Sugarcane Seed Cutting

Working principle behind the process simple mechanical cutting mechanism mainly Crank and slider mechanism. The crank revolved by rotor the revolving crank is changed into the reciprocating motion. The rotating shaft and connecting rod is connected to the crank and cutting blades. The sugarcane which is cut thought the cutting blades. [1], [5]

B. Groundnut Stripper

It consists of hollow cylinder with the rod welded on the its periphery. The electric motor which is connected to the external power supply transmitted to the shaft. The rotating shaft is mounted on the roller cylinder. Groundnuts are supplied in a rotating blades will be separating the groundnut from the plants and shelling. [3][7]

C. Straw Cutting

It consists of four blades which is mounted in a circular ring that connected to the motor through the belt drive. Rotating blades will be cut the straw into small pieces. [2].

IV. MODELLING OF MACINE PARTS

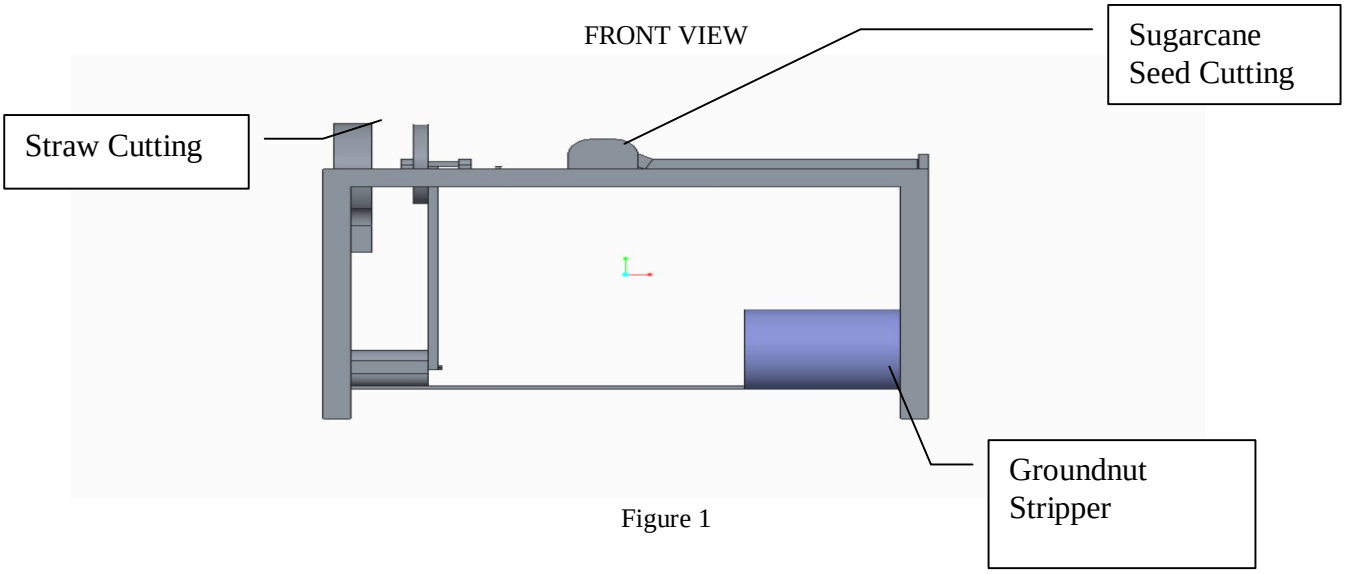


Figure 1

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TOP VIEW

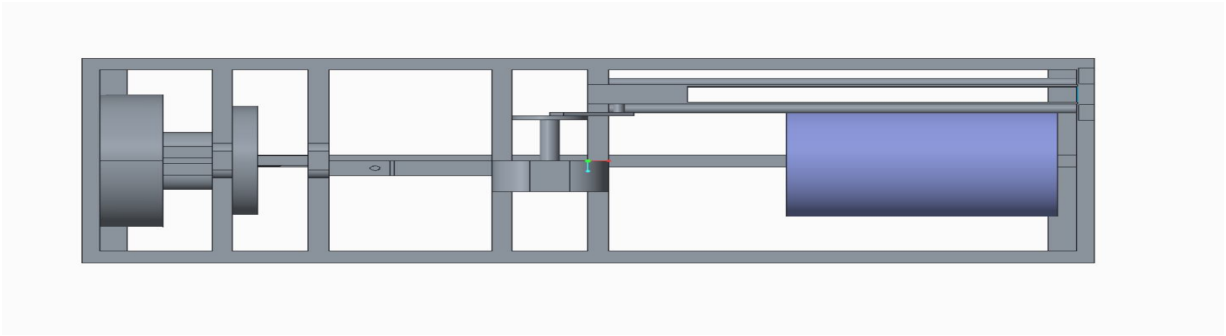


Figure 2

SIDE VIEW

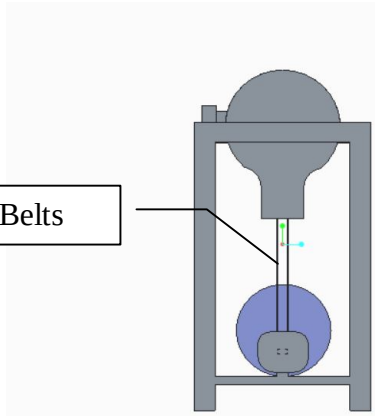


Figure 3

Figure 4

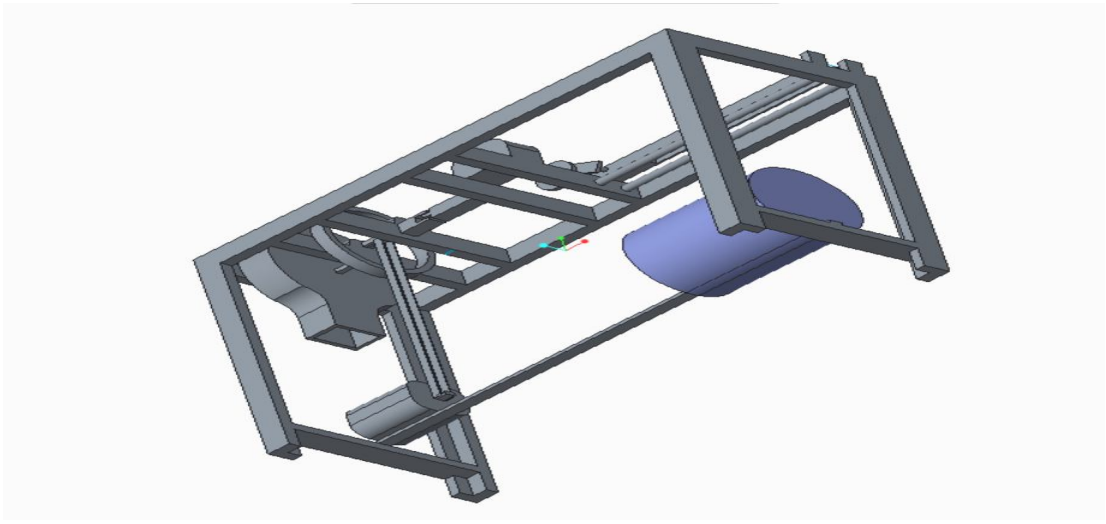


Figure 5

The (figure 1,2,3,4 & 5) are shows design of multipurpose cutting machine by using of "Cero CAD" modelling software.

V. MATERIAL USED

A. Square & Rectangle Shaped Frame - Base- 18*36 mm & Height -30 inch.
B. Electric Motor -1 HP.
C. Gear Box - Worm Gear 8 rpm.
D. Wheel Pulley - B-type 12 inch.
E. Pulley of Machine - Cast Iron 2 inch
F. Shaft - Mild Steel
G. V- Belts
H. Cam- Mild Steel diameter 25 mm
I. Pedestal Bearing- Cast Iron p205
J. Universal Joint- Mild steel

VI. ADVANTAGES

A. Human effort is reduced.
B. Wastage of sugarcane is reduced.
C. These bad chips are less bulky so transportation of chips is easy.
D. Less time is used as compared to conventional process.
E. Easy to operate.
F. Labour cost is reduced.
G. Sugar cane are used to white Sugar production and juice

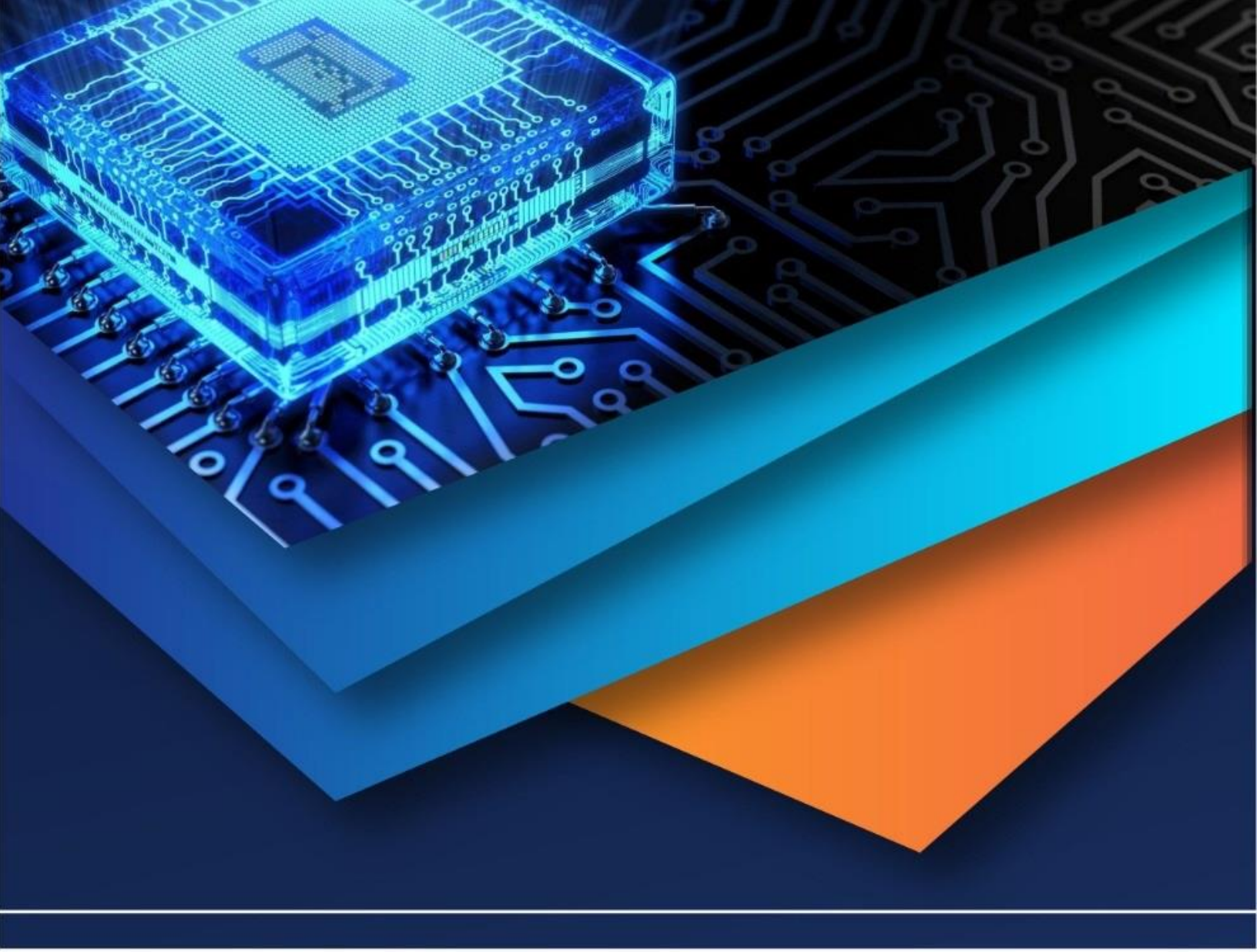
VII.CONCLUSION

In multipurpose cutting machine, three individual operations are combined. By using this machine the problem of labour heads can be reduced, because it makes the process briskly and labour needed for operate the machine is also lower. It performs further than one operation, so recycling time can be saved. In the sugarcane seed cutting operation destruction of sugarcane can be controlled and cut seeds are easy to sowing. In the groundnut stripping operation rather of 10-20 labours per acre only two labours can separate the groundnuts from factory by using this machine. By using this machine destruction will be less and rather of 5-6 labours only 2 labours can do the same operations in minimum time. However, which reduces the labours cost and process come briskly and readily, If this machine is used by maximum number of growers surely planter can overcome the labour heads problem.

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