

# Development of Multi Crop Cutting Machine

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## Abstract

The main source of income in India is agriculture. The crop cutting is important stage in agriculture field. Needs to concentrate in some aspects like how to increase productivity and profit, how to reduce cost and how to solve and ease the problems of workers. To overcome this a new manually operated cutter is fabricated for cutting of multiple crops. Currently in India farmer used conventional method for crop cutting i.e. the conventional method for crop cutting is as manually cutting using men power but this method is very tedious and time consuming. This research aim is to develop of small field crop cutting machine for small height and small stem crop. It is used to reduce farmer's effort and to increase rate of cutting crop. The machine consist of various mechanisms which are used in this machine. When compare to manual crop cutting by using this machine has a capacity to cut the crop in faster rate. This machine is employed by poor farmers that don't seem to be capable to shop for Harvester machine, manslayer binder machine, etc. due to high price.

KEYWORDS: Crop cutting, Agriculture, Mechanism.

## 1. Introduction

Recently ruler has seen a shortage of trained labour on the market for agriculture. Due to this shortage the farmers have transitioned to exploitation harvesters. These harvesters are on the market for purchase however they're not cheap due to their high costs, however, agriculture teams create these on the market for rent on Associate in Nursing hourly basis. however the tiny holding farm owners i.e. usually having land but two Acers generally don't need the full-featured mix harvesters[4]. Due to money or transportation reasons these mix harvesters aren't on the market all told components of geographic area. Thus, there is a need for a smaller and economical mix harvester which might be significantly cheaper and additionally a lot of accessible. The mission is to form a transportable, low price mini harvester and easy. These issues gave United States the essential plan about what was needed within the current scenario. The thought was to form a machine which is able to cut back the labour required to reap crops and that is reasonable. This machine has the aptitude and therefore the measure for fulfilling the needs of farmers having tiny land holdings that is a smaller amount than two acres and easy of cutting operation to the small land holder. This machine is price effective and additionally straightforward to maintain and repair for farmers [1,3,4].

## 2. Problem Identification

- (i) Currently in Asian nation former used standard methodology for the crop cutting i.e. the traditional methodology for crop cutting is as manually cutting victimisation labour.
- (ii) However this methodology is drawn-out and time overwhelming. Harvesters are accessible for purchase however as a result of their high prices, they're not cheap.
- (iii) However the little scale farmers World Health Organization have expanse of less than two acres usually don't need the full featured mix harvesters.

## 3. Machine components

Multi crop cutting machine having following components;

- Frame
- Shafts
- Blades
- Wheels
- Belt-Pulleys
- Bevel gears
- Crank-Lever mechanism

## 4. Material Selection

Many shafts of our machine is made from cold drawn, low carbon, or hot-rolled steel Alloy steel: Nickel, vanadium and chromium are some of the common alloying materials. However, alloy steel is comparatively costly. Shafts of cutting mechanism usually don't need to be surface hardened until and unless they serve as the actual journal of a bearing surface. Hardening of surface of shaft (wear resistant): case hardening, carburizing, cyaniding and nitrating.

Sr. No.	Name of Components	Material
1.	Shaft	Mild steel
2.	Blade	Stainless steel
3.	Smaller Pulley	Mild steel
4.	Larger Pulley	Mild steel
5.	Pair of Bevel gear	Mild steel
6.	Pair of Front wheel(Small)	Plastic wheel
7.	Pair of Rear wheel (Large)	Alloy wheel

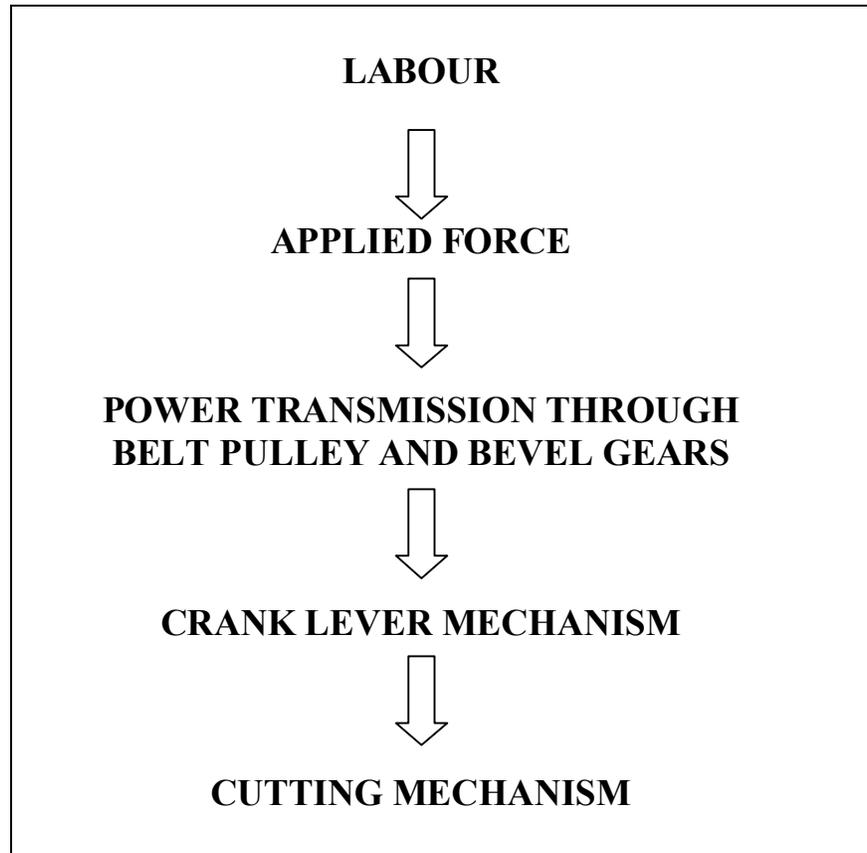
Table 4.1: Components of Mmulti Crop cutting Machine

### 4.1. Machine Components

The machine consists of different parts including two big rear wheel & two small front wheel, two pulleys, ripper binder blades, bevel gears, crank & connecting rod, etc. we classified it into

three sections as follows: (1) Chassis arrangement (2) Power transmission arrangement (3) Cutting arrangement.

The input (pushing force) is given by the labour to the machine. The output of first arrangement is used as input of power transmission arrangement and the output of of second arrangement is then given to cutting blades.



**Fig.4.1** Layout of Machine Arrangement

## 4.2. Working Principle

The machine is employed for cutting stems of the cereal crops. The machine is operated with facilitate of the manual power. Machine has a pair of shaft that are driven by the rear wheel, once machine gets started shaft on rear wheel is revolved and since it's as well as the sequential vertical shaft by pulley-block and gear arrangement, the shaft conjointly rotates. The crank lever arrangement established between blade and shaft and therefore blades can move reciprocate.

The speed of cutter is varied with the assistance of speed of the cutter machine (Pushing speed) that handle provided on the Chassis. Then we have a tendency to grip the machine handle and take the Cutter Machine into the particular field of crops wherever we want to chop the cereal stem then we have a tendency to choose a row of crop stems and machine go on this row. When cutting of stems they are taken by employee and are separated from the sector. Thus our

machine is totally manual thanks to that we are able to regulate the cutting feed of the machine manually.



**Fig. 4.2:** Power Transmission and Cutting Arrangements of Machine

## 5. Result and Discussion

This machine is very useful to cut the different type of the crops like long grass, paddy, wheat etc. it reduces the time and cost of cutting. After cutting wheat crop in one Acre area, we found following results:

(i) For Manual Cutting

S.No.	Crop	Labour	Area	Time	Cost
1.	Wheat	02	1 Acre	04 Hr.	Rs.450

(ii) For Machine Cutting

S.No.	Crop	Labour	Area	Time	Cost
1.	Wheat	01	1 Acre	02 Hr.	Rs.150

**Table 5.1:** Comparison between Labour and Machine.



**Fig.5.1:** Multi Crop Cutting Machine

## 6. Conclusion

In this approach the planning of multi crop cutter is safe, such human powered machine systems can facilitate to a good extent to improve the condition and employability of such countries. A brand new kind of mechanism is unreal which is totally different from different crop cutting machines can work on non-conventional energy supply and strictly human operated. Such systems are of terribly importance in Asian countries as most Asian countries face electricity and power deficiency which ends in twelve to 14 hours load shedding in rural areas particularly in Asian nation.

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