

DESIGN AND FABRICATION OF PULVERIZER MACHINE: A REVIEW

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ABSTRACT

Pulveriser is a hay or straw cutting machine which is used in uniform chopping of the chaff for livestock or raw material to agro industries. The various types of fodder can be processed in this machine are forage grass, green grass, dry corn straw, and wheat stalk etc. The final products can be used to feed cattle, goats, deer, and horses. It can also process cotton stalk, bark, and small branches. Chaff cutters have developed gradually from the basic machines into commercial standard machines that can be driven at various speeds so as to achieve various lengths of cuts of chaff with respect to animal preference type. New chaff cutter machines consist of portable tractor driven chaff cutter where chaff cutter can be in the field and load trolleys.

Chaff cutters are made up of feeding part, cutting and throwing part, transmitting part, walking part and safety device, so it is reasonably structured, easy to be moved with autonomous feeding. It is safe and reliable. The feeding structure is made up of the feeding platform, transmitting chains, feeding roller, set knives and set knife frame. The cutting and throwing structures are mainly made up of motion knife, knife frame and locking bolt. Transmitting structure mainly consists of triangle belt, transmitting axle, gears, universal joints and chains. Walking structure is made up of the ground wheels or walking rubber wheels and traction frame.

Keyword: - Pulverizer, Chaff, Uniform chopping, agro industries, Tractor driven chaff cutter.

1. INTRODUCTION

A pulverizer or grinder is a mechanical device used for the grinding of many different types of materials. The chaff cutter cum pulverizer is a machine which is used for the combine operation of cutting the straw and pulverizing the necessary animal foods such as corn, wheat, millet etc.

A chaff cutter is a mechanical device used to cut the straw or hay into small pieces so as to mix it together with other forage grass and fed to horses and cattle. This improves the animal's digestion and prevents animals from rejecting any part of their food.

A Pulverizer is a machine whose purpose is to shred or crush aggregate material into smaller pieces by the repeated blows of number of hammering plates. These machines have many sorts of applications in many industries, including:

- 1] A farm machine, which mills grain into coarse flour to be fed to livestock.
- 2] Fruit juice production.
- 3] Grinding used shipping pallets for mulch.
- 4] Milling grain.
- 5] Shredding paper.
- 6] In waste management.

2. LITURATURE SURVEY

A survey helps in understanding the topic clearly and to frame a strategy for solving the given problem. The following are the terminologies referred from journal paper.

- ¹Chaff cutter is a hay or straw cutting machine which is used in uniform chopping of the fodder for livestock or raw material to agro industries. The various types of fodder can be processed in this machine are forage grass, green grass, dry corn straw, and wheat stalk. The final products can be used to feed cattle, goats, deer, and horses.
- ²In recent past a human powered processing machine has been developed for fodder cutting. Machine consists of a human powered flywheel or a bicycle drive with speed variation mechanism. Hence, the effort for the process was extensive and unsafe. To overcome these obstacles we have designed a new cutting mechanism which is safer and effort reducing with minimum power consumption.
- ³Chaff Cutter Machine is hay or straw cutting machine which is used for uniform chopping of fodder for livestock to agro industries. In this paper, design and development of Chaff Cutter Machine is presented. The machine is developed gradually from basic machines into commercial standard machine that can be electrical driven to achieve various length of cut of chaff as per the preference. The new chaff cutter machine is modified for its compactness and to avoid blockage of grass.
- ⁴In India, animal husbandry is an integral part of the rural economy. The forage (dry or wet) production requires high labour coupled with a lack of sufficient land for forage. Production and forage scarcity during the dry season means that available forage must be efficiently used to minimize waste.
- ⁵Livestock production and agriculture are relatively linked together, and both crucial for overall food security. Livestock sector is an important livelihood activity foremost of the farmers, small and semi medium farmers with average operational holdings of area less than 4 ha own about 87.7% of the livestock of this country.

3. MAIN COMPONENTS

A pulverizer or grinder is a mechanical device used for the grinding of many different types of materials. The chaff cutter cum pulverizer is a machine which is used for the combine operation of cutting the straw and pulverizing the necessary animal foods such as corn, wheat, millet etc.

The common components of pulveriser machine are as:

3.1 Power Source – Electric Motor:

An electric motor is an electrical machine that converts electrical energy into mechanical energy. The reverse of this is the conversion of mechanical energy into electrical energy and is done by an electric generator, which has much in common with a motor.

3.2 V-Belt:

The V-Belt is use to transmit the power from one pulley to another. The V-Belt has been in existence since the early 1920's. Through the years, many modification are done in the use of material of V-belt construction and in cross sectional shape as well. Originally, V-belts came into existence to replace the flat and round belts on automotive drives to ensure greater reliability. V belt drive arrangement is used to transmit power from motor to shaft which is connected to cutter mechanism.

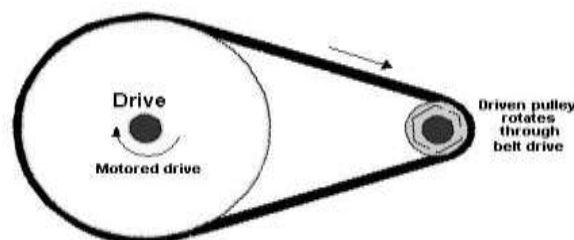


Fig 1 - V-Belt

3.3 Pulverising Cutting Blade Assembly

This is the main section of the chaff cutting machine. The fine and uniform chopping of the chaff is done in this Section.

Cutter blade is the main part in chaff cutting machine which has consists of two blades i.e. one is cutting blade and other is pulverizing blade.

a) Main blade: They have sharp edge, they used to cut grass into number of small steps. So that they can easily rotated in chaff cutting housing & get crushed in powder form by centrifugal blade

b) Centrifugal blade: It is used to crush grass in powder form which throws the powder at the exhaust with high speed.

D) Supporting Frame- The frame is built so rigid such that it can resist the load of different parts of machine.

4. CONCLUSIONS

- The Chaff Cutting and Pulverizing machine is combined to perform the cutting and crushing operation more efficiently.
- By using different types of blades we can obtain different types of chaff for animal.
- Pulveriser machine can cut the sugarcane waste so that it can be utilized as a fodder for animal as well as grind various feeding materials such as dry corn straw, grass, soya bean, wheat stalk with ease and thus reducing the manual work of farmer and increases the fodder production.

5. FUTURE SCOPE

- The volume of production can be increased with increased in power supply.
- With the more modified designs, the chaff cutting and pulverizing operation can be performed simultaneously.
- It can be made Solar Powered.
- Newer design of cutting machines include portable tractor driven chaff cutters in which cutting of chaff is done in the field and loaded in trolleys.

6. REFERENCES

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BIOGRAPHIES



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