

CATTLE FEED CUTTING MACHINE

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ABSTRACT

The cattle feed cutting machine is mainly used for supplying required nutrients to animals and poultry feed. There are high-cost machineries available in the market. The final products can be used to feed cattle, goats, deer, and horses. 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. This paper represents the design, fabrication, development and testing of a low cost electrically operated animal feed cutting machine with locally available materials and promote their business well in the field.

Keywords: Cutter, DC motor, Battery, Solar panel

I. INTRODUCTION

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. Chaff and operations until they were replaced by tractors in the 1940s. Chaff cutters have developed gradually from the simple machines to commercial standard machines that can be driven at various speeds so as to achieve various sizes of chaff with respect to animal preference type. New chaff cutter machines include portable tractor driven chaff cutters in which cutting of chaff is done in the field and loaded in trolleys. The present green fodder cutting machine features a single, only rod-shaped cut green fodder, green fodder cannot cut block. Whether peasant family, tribunal or farms and sales markets are in urgent need of a new, practical, functional and greener fodder cutter. And as per today's scenario the population of cattle is drastically increased. So to increase the productivity and reduce the physical effort required

for running the machine the motorized machineries came into existence.

II. EXISTINGSYSTEM

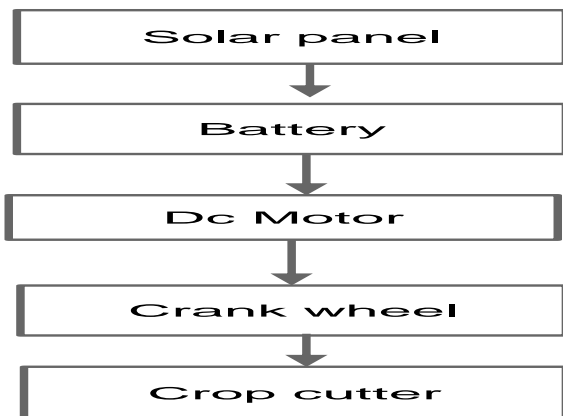
- The past technology of grass cutting is manually operated by the use of hand devices like scissor, these results into more human effort and more time required accomplishing the work.
- Also in old methods lack of uniformity of the remaining grass. Also due to the use of engine powered machines increases the air and noise pollution also this grass cutter require maintenance.
- In the cattle cutting machine we used both grass and feed cutters.

III. DESCRIPTION

The base frame which acts a chassis of vehicle is fabricated with the help of square tubes and channels by metal cutting and metal joining process called welding. Four wheels are attached to the

chassis with the help of axle shaft, in which two at front side and other two at rear side. At the front end portion of chassis a fixed and movable cutter blades are placed, in which fixed blade is attached to the chassis and the movable blade is attached with yoke plate which get meshed with scotch plate. This scotch plate receives drive from the DC motor which is fixed at the top portion of chassis frame. This drive is coupled to the operational shaft which consists of bevel gear arrangement to link with scotch plate. On the other hand this operational shaft also has a chain drive arrangement to transfer the rotation obtained to the cutter blade. The cutter blade arrangement is placed at the rear end portion of chassis, which consists of rotating cutter blade which receives drive form DC source through chain drive arrangement. The source to operate the drive is provided with the help of battery which gets charged through solar panel which is incorporated with our system.

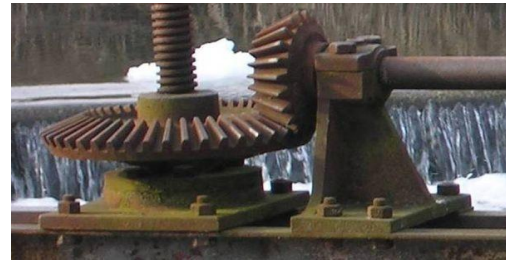
IV. BLOCK DIAGRAM



V. COMPONENTS USED

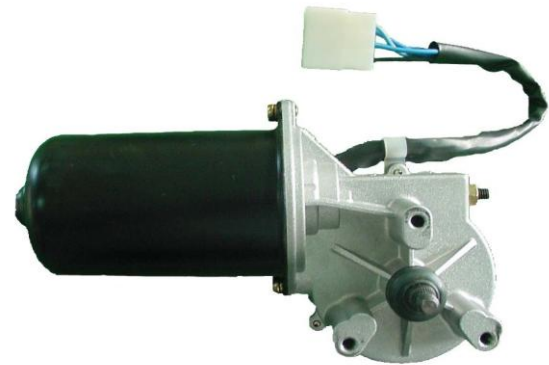
BEVEL GEAR

Bevel gears are gears where the axes of the two shafts intersect and the tooth-bearing faces of the gears themselves are conically shaped. Bevel gears are most often mounted on shafts that are 90 degrees apart, but can be designed to work at other angles as well. The pitch surface of bevel gears is a cone.



- Cast steel, which is used where stress on the gear is high and it is difficult to fabricate the gears.
- Plain carbon steels, which find application for industrial gears where high toughness combined with high strength.
- Alloy steels, strength and low tooth wear are required. which are used where high tooth.

DC MOTOR



A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic; to periodically change the direction of current flow in part of the motor. Different number of stator and armature fields as well as how they are connected provides different inherent speed/torque regulation characteristics. The speed of a DC motor can be controlled by changing the voltage applied to the armature. The introduction of variable resistance in the armature circuit or field circuit allowed speed control. Modern DC motors are often controlled by power electronics systems which adjust the voltage

by "chopping" the DC current into on and off cycles which have an effective lower voltage.

The internal configuration of a DC motor is designed to harness the magnetic interaction between a current-carrying conductor and an external magnetic field to generate rotational motion.

SOLAR PANEL

We recommend a solar array created from individual solar cells as opposed to one made of prefabricated solar panels. It enhances the students' learning and can result in a lighter solar array. Cells can be bought from either Siemens or ASE Americas. Both sell the terrestrial-grade cells that are permitted in the Winston Solar Challenge, and the cost for terrestrial-grade cells are much lower than space-grade cells, though terrestrial-grade is less efficient. Each solar cell should produce .5 volts at about 3 amps at peak sunlight. The number of cells to use depends on their size and the allowable solar area per Winston rules. Solar cells should be wired in series on a panel and should be divided into several zones. For example, if you have 750 solar cells, you might want to wire 3 sets of 250 cells, each zone producing about 125 volts. If one zone fails, two other zones are still producing power.



The solar array voltage does not need to match the system voltage of the motor if you use power trackers. Power trackers convert the solar array voltage to the system voltage. They are essential in a solar car. Be sure to verify with the power tracker vendor the necessary array voltage to feed the power trackers. If the car drives underneath shade, the power trackers automatically adjusts the power to

match system voltage, allowing the system to run as efficient as possible. Power trackers are available from AERL. Solar panel refers either to a photovoltaic module, a solar hot water panel, or to a set of solar photovoltaic (PV) modules electrically connected and mounted on a supporting structure. A PV module is a packaged, connected assembly of solar cells. Solar panels can be used as a component of a larger photovoltaic system to generate and supply electricity in commercial and residential applications. Each module is rated by its DC output power under standard test conditions (STC), and typically ranges from 100 to 320 watts. The efficiency of a module determines the area of a module given the same rated output – an 8% efficient 230watt module will have twice the area of a 16% efficient 230watt module. There are a few solar panels available that are exceeding 19% efficiency. A single solar module can produce only a limited amount of power; most installations contain multiple modules. A photovoltaic system typically includes a panel or an array of solar modules, an inverter, and sometimes a battery and/or solar tracker and interconnection wiring.

BATTERY

A battery is a device that converts chemical energy directly to electrical energy. It consists of a number of voltaic cells; each voltaic cell consists of two half cells connected in series by a conductive electrolyte containing anions and cations. One half cell includes electrolyte and the electrode to which anions migrate, i.e., the anode or negative electrode; the other half-cell includes electrolyte and the electrode



to which cations migrate, i.e., the cathode or positive electrode. In the redox reaction that powers the battery, reduction occurs to cations at the cathode, while oxidation occurs to anions at the anode. The electrodes do not touch each other but they are electrically connected by the electrolyte. Some cells use two half-cells with different electrolytes. A separator between half cells allows ions to flow, but prevents mixing of the electrolytes. Each half cell has an electromotive force determined by its ability to drive electric current from the interior to the exterior of the cell. The net EMF of the cell is the difference between the EMF of its half-cells, as first recognized by Volta. Therefore, if the electrodes have EMF and, then the net EMF is in other words, the net EMF is the difference between the reduction potentials of the half-reactions.

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VI. WORKING PRINCIPLE

For performing grass cutting operation the machine is placed on the field where the grass cutting operation has to be performed. By turning on the dc motor, causes the operational shaft coupled directly to rotate about its fixed axis, this rotation is transferred to the scotch plate with the help of bevel gear arrangement. The rotation of scotch plate makes the yoke plate to take a linear motion. This motion disturbs the movable blade and makes it to slide on the fixed blade, this movement performs cutting operation on the intermediate object.

VII. CONCLUSION

- Pulveriser machine can cut the sugarcane waste so that it can be utilized as a fodder for animal.
- 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.
- Simple structure and cost efficient. Less storage space is enough. Time consumption is less. Spare parts are easy to change and availability is also high. Less maintenance is enough for its better performance.

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