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DESIGN AND FABRICATION OF MULTI-PURPOSE CUTTING MACHINE A REVIEW

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ABSTRACT

Our project deals with the design, development and fabrication of multipurpose mechanical machine which perform four operations at a time namely drilling, angle cutting and grinding and wooden cutting, Coconut cutting, Betel cutting also walnut Cutting etc. we see that these operations are the heart of any workshop/machine shop and they are indispensable, so for the time saving of any organization four different operation on four different job can be performed simultaneously, however jigs and fixtures are required to attain this, but when our need is specified and particular then this machine can be a time saving equipment.This machine is automatic and controlled by electric motor and it is based on the Belt and pulley mechanism. It can be used in small scale industries/workshop to work upon thin metallic sheets and on wood in carpentry shop.

Keywords- Bevel gear, Cutting wheel, Drill bit, Grinding wheel. Automatic Sowing, Multipurpose, Machinery, Cutter,. Hopper, Seed metering mechanism etc.

I. INTRODUCTION

DRILLING

Drilling is a cutting process that uses a drill bit to cut a hole of circular cross-section in solid materials. The drill bit is usually a rotary cutting tool, often multi-point. The bit is pressed against the work- piece and rotated at rates from hundred stot thousands of revolutions per minute. This forces the cutting edge against the work-piece, cutting off chips from the hole as it is drilled. A drill is a tool fitted with a cutting tool attachment or driving tool attachment, usually a drill bit or driver bit, used for boring holes in various materials together.

GRINDING

A grinding machine, often shortened to grinder, is any of various power of tools used for grinding, which is a type of machining using an abrasive wheel as the cutting tool Each grains of abrasive on the wheel`s surface cuts a small chip from the work-piece via shear deformation.

CUTTING

In the context of machining, a cutting tool or cutter is any tool that is used to remove material from the work-piece by means of shear deformation. Cutting may be accomplished by single-point or multi-point tools. Single-point tools are Used in turning, shaping, planning, similar operations, and remove material by means of one cutting edge. Milling and Drilling tools are often multipoint tools. Grinding tools are also multipoint tools. Each grain of abrasive function as Materials together with the use of fasteners. The attachment is gripped by a chuck at one end of the drill and rotated while pressed against the target material. The tip and sometimes edges, of the cutting tool does the work of cutting into the target material. This may be slicing off thin shavings (twist drills or auger bits), grinding off small particles (oil drilling), crushing and removing pieces of the work-piece (SDS masonry drill), countersinking, counter boring, or other operations. Drills are commonly used in woodworking, metal working, construction and do-it-yourself projects. Specially designed drills are also used in medicine, space missions and other applications. Drills are available with a wide variety of performance characteristics, such as power and capacity.

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II. REVIEW OF WORK CARRIED OUT

Jayesh S. kamble et al[1] carried out study of the design analysis of multi purpose cutting machine for agriculture. In this groundnut stripping activity rather than 10 -20 works for each section of land just two works. T. Moriwaki, et al [2] carried out the study design and fabrication for multipurpose cutting machine has started fabrication and for design keeping small Scale industry in the mind, this cutter which was design is having good Cutting capacity on small scale industry. Rudolf Charles, et al [3]" carried out the study of Design and fabrication of crop cutter for multipurpose application" has stated The crop cutter was designed keeping small scale farmers in mind. This crop cutter which was designed is having good harvesting capacity for small farms. Since it does not utilize any engine for its operation, the cutting action is done by cranking of lever by hand. Marco Bentini, et al [4] carried out the study of "Prototype for the harvesting of cultivated herbaceous energy crops, an economic and technical evaluation" has stated to create a reliable supply chain it is necessary to achieve efficient and sustainable cultivation. In particular the phase of harvesting and pre-treatment of the biomass can improve its characteristics, increase energy density, and reduce storage, transport and handling costs. "Sandeep kumar, et al [5] carried out the study of "Development of multipurpose Agriculture cutter" has stated we studied about harvesting operation to the small land holders for harvesting varieties of crop in less time and at low cost by considering different factors as power requirement , cost of equipment , ease of operation , field condition "Dhatchanamoorthy. N, et al [6] carried out the study of "Design and Fabrication of Multipurpose Agriculture Vehicle" has stated that harvester design is based on the design of brush cutter. The cutter is more robust and stronger. The denser vegetation can be cleared with it easily. "Amar B. Mule, et al[7] carried out the study of "Design And Fabrication Of Harvesting Machine" has stated the cutting and threshing machine for seed separation this method the crop are remove as mentioned in the traditional method. These method crops are tied together to from a bundle. These bundles are garnered and taken to threshing Machine. Heinrich Arnold1 et al. [8], In his research rather long re-investment cycles of about 15 years have created the notion that innovation in the machine tool industry happens incrementally. But looking at its recent history, the integration of digital controls technology and computers into machine tools has hit the industry in three waves of technology shocks. Most companies underestimated the impact of this new technology. This article gives an overview of the history of the machine tool industry since numerical controls were invented and introduced and analyzes the disruptive character of this new technology on the market. The study establishes a connection between radical technological change, industry structure, and competitive environment. It reveals a number of important occurrences and interrelations that have so far gone unnoticed. Dr. Toshimichi Moriwaki et al. [9], According to this review high speed and high performance machine tools are main aim the machine tool technologies. In recent trends we are also focused on combined multifunctional machine tools Open Source Gift Guide article on the Make Magazine website, in which the multi machine was mentioned under the caption "Multi machine – Open Source machine tool" Sharad Shrivastava and Shivam Shrivastava, Et al [10] carried out the study of "Design and fabrication of motorized mechanical machine "we studied about The Multi-Purpose Mechanical Machine is widely used in manufacturing. Industries are primarily, It can be used to work on thin metallic sheets and wood in a carpentry shop in small size industries/workshops.

III. DESCRIPTION OF EQUIPMENTS BEARING

A bearing is a device to permit constrained relative motion between two parts, typically rotation or linear movement.Bearingsmaybeclassifiedbroadlyaccordingtothemotionstheyallowandaccordingtotheirprincipleofoperation. Low friction bearings are often important for efficiency, to reduce wear and to facilitate high speeds. Essentially, a bearing can reduce friction by virtue of its shape, by its material, or by introducing and containing a fluid between surfaces. By shape, gains advantage usually by using spheres or rollers.

LINEAR BEARING

A linear-motion bearing or linear slide is a designed to provide free motion in one dimension. There are many different types of linear motion bearings and this family of products is generally broken down into two sub-categories: rolling-element and plane.

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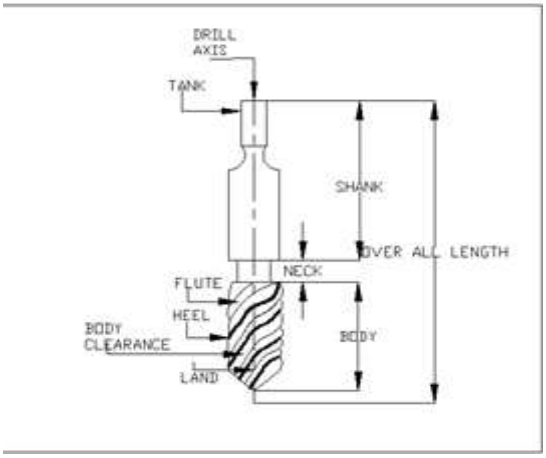
IV. DRILLING TOOL

Drillingtoolisacylindricalend-cuttingtoolusedtooriginateorenlargecircularholesinsolidmaterial.Usually,drills are rotated by a drilling machine and fed into stationary work, but on other types of machines a stationary drill may be fed into rotating work or drill and work may rotate in opposite directions.



V. INDUCTION MOTOR

An induction motor (or asynchronous motor) is a type of alternating current motor where power is supplied to the rotor by means of electromagnetic induction. An electric motor convert's electrical power to mechanical power in its rotor (rotating part).There are several ways to supply power to the rotor. In a DC motor this power is supplied to the armature directly from a DC source, while in an induction motor this power is induced in the rotating device. An induction motor is sometimes called a rotating transformer because the stator (stationary part) is essentially the primary side of the transformer and the rotor (rotating part) is the secondary side. The primary side's currents evokes a magnetic field which interacts with the secondary side to produce are resultant torque, hence forth serving the purpose of producing mechanical energy. Induction motors are widely used, especially poly phase induction motors, which are frequently used in industrial drive

VI. ADVANTAGES

- **Less employee cost-** By adding multi-purpose machine to an operation, means less employees are needed to get the job done. It also indicates less safety issues, which leads to financial saving.
- **Reduction in production time**-Having a machine that is automated definitely speeds up the production time since no thinking needed by the machine, there is better repeatability, and less human error.

VII. APPLICATIONS

- Used in small scale industries to reduce machine cost.
- In such places where frequent change in operation are required.

VIII. CONCLUSION

The project has been designed to perform different task in a single machine. Hence this project has made an impact in the field of manufacturing among the small scale industries. It is very use full forth micro small and medium to have only minimum space to accommodate this machine. Also this project will reduce the cost involve in the manufacturing of small scale industries.

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