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THE DEVELOPMENT OF A VERSATILE MOTORIZED MACHINE PROCESS WITH INPROCESS OF DESIGN AND FABRICATION

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Abstract
Three operations are combined into one operation on the motorised multi-operation machine. Drilling, grinding, and cutting comprise the three processes. The device is designed to cut down on production expenses and time. Instead of separate devices like drilling machines, grinding machines, and hacksaw cutting machines, one machine is employed for all three tasks. The construction of a multifunctional mechanical device that can carry out a variety of tasks on a single machine is the subject of this research. The created machine features a single prime mover and is capable of carrying out tasks like cutting, drilling, and grinding all in one unit. All three of these tasks can be completed by the machine simultaneously thanks to its motor drive and bevel gear arrangement.
Keywords : Drilling, Cutting, Grinding, etc.

I. Introduction

DRILLING

A drill is a tool used in the cutting process to make a circular cross-sectional hole in a solid material. Typical rotary cutters used in drills frequently have numerous points. A drill is a tool with a drive or knife attachment that makes holes in a range of materials using a bit for drilling or bit.

GRINDING

Any of the many power equipment for grinding that use a grinding as the cutting wheel tool are called grinders or simply grinders. Each grit on the surface of the grinding wheel creates a shear deformation that removes small chips from the workpiece.

CUTTING

Any tool that uses shear deformation to remove material from the workpiece is referred to as a cutting tool or cutter in the context of machining. Tools with a single point or several points can cut. In turning, shaping, planing, and other comparable processes, single-point tools are used to remove material using a single cutting edge. Multipoint tools are frequently used for milling and drilling. Multipoint tools include tools for grinding. Each abrasive grain shears a tiny chip with a miniscule single point cutting edge (although one with a high negative rake angle). A drill is a device having a driving tool attachment or a cutting tool attachment, typically a drill bit or driver bit, that is used to fix or drill holesin a variety of materials.

II. LITERATURE REVIEW

The multi machine is a general-purpose machine tool with the capabilities of a milling machine, drill press, and lathe. It can be used for numerous tasks crucial to the humanitarian and economic development of developing nations, including: A semi-skilled mechanic can build the multi machine, an all-purpose open source machine tool, for a reasonable price from discarded car and truck parts and simple hand tools with no power. Its dimensions might range from being as little as a wardrobe to being a hundred times larger. The multi machine is capable of accurately handling every job in an entire machine shop by itself. Pat Delaney first created the multi machine as a side project for himself, which later evolved into an open source endeavour coordinated through a Yahoo! group. Engineers, machinists, and experimenters who have established the machine's viability make up the 2,600-member support organisation that has developed around its invention. The Multi machine, an open-source machine tool that can be manufactured affordably on-site, may have various applications in underdeveloped nations. Currently, the multi machine group is concentrating on the humanitarian benefits of the multi machine and spreading the idea of the multi machine as a way to boost economic growth and employment in developing nations. A larger audience initially learned about the multi machine as a result of the 2006 Make Magazine article titled "Open Source Gift Guide," which mentioned the multi machine under the description "Multi machine - Open Source machine tool.".

The machine tool business is essential to the investment goods industry, while making up only approximately 2% of total industrial production. It gives the manufacturing industries their main source of industrial equipment. Along with its primary markets, the machinery industry, the automotive industry, the defence and aerospace industry, and other investment goods industries, the machine tool industry grew and matured.Through a well-organized network of sales agents, the US had established a strong position in the international export markets by the turn of the twentieth century. In fact, the two World Wars improved the standing of US industries. Germany, which had been the top exporter in the world in 1910, fell behind. In Germany, a large portion of the industrial sector had been destroyed following World War II. The UK was fortunate to have a manufacturing infrastructure that was mostly unaffected by the war because it had led the development of machine tools since the industrial revolution.The destruction of the rest of Europe's manufacturing sectors made it crucial for manufacturing enterprises' post-war strategies to have access to equipment.At nearly any cost, equipment was desperately needed. Up until the advent of numerical controls in the 1970s, innovation remained incremental. This rattled the industry and produced major issues for long-standing businesses. The traditional product line of the US machine tool industry saw a significant disruption as a result of the merger of numerical control. the era of digital electronic machine-tool controls, which opened the market to a wide range of new goods and business models. Several businesses failed to transform their operations, while others succeeded.The machine tool industry experienced what Christensen had seen for the rigid disc drive business in the face of dramatic technological change. Many of the well-known businesses were ousted from their positions, filed for bankruptcy, were acquired, or simply left the market. When technology changed, the market for machine tools in the US producers also experienced instability; from 1971 to 1986, only 5 of the 15 largest businesses were in this sector.Between 1972 and 1987, the US lost its top spot as the world's largest manufacturer of machine tools to Germany and the newcomer Japan, as well as statistically to the Soviet Union (see figure below).With up to 30% of the global market in the years following World War II, the US had become the top producer of machine tools.On the other hand, US influence diminished in the late 1960s. Even though the US was using more machine tools, the US manufacturer's market share fell to 15% by 1970, trailing Germany, which held between 15% and 20% of the market.Regarding

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export volume, Germany was once again in the forefront. Germany possessed 30% of global export trade by 1977.This state of affairs persisted until 1980, when Japan, concurrent with the advent of computers into numerical controls, seized 20% of the global market.The US market share further decreased to roughly 10%, and it also lost dominance in its own country. Similar to how employment decreased from 81,000 in 1960 to 62,000 in 1976, the British share of the global market decreased at the same time, from 8% in 1971 to 5% in 1977 and to 3% in 1981. imported machine tools On the other hand, the Swiss companies were – despite the contemporaneous crisis in the watch industry, their most important home market - able to retain their share of the world market. However, European businesses generally lost ground.The main industrialised nations' economy experienced modest development after 1973. Machine tool users were looking for ways to make their operations more efficient. NC machine tools, which provided increased flexibility and lower costs, were therefore widely appreciated. There was a sharp increase in demand for less expensive NC equipment in the US and Western Europe.Decision-makers whose organisations were not "first to market" in the interview series claimed that their introduction of NCs had been a response to client demand for the NC features. Since the late 1980s, data on global competitiveness at the level of a single firm have been available.It suggests that the adoption of PC technology, the next stage of technical development, had an equivalent impact on market shifts. None of the top 15 companies from 1971 stayed there after an extra twelve-year period (see figure below). UNOVA and Thyssen were two of the emerging dominant firms in 1999/2000.
Rendeiro's article, "How the Japanese Came to Dominate the Machine Tool," describes these impacts.
The happenings in the sector may initially appear to be the outcome of industry consolidation through mergers and takeovers. However, over the past 50 years, the overall number of businesses has expanded somewhat. The industry's small-scale structure, which may be a sign of market maturity, hasn't altered much since the 1970s; the distribution of company sizes hasn't moved much since 1955. About 40% of businesses in Germany had fewer than 50 employees. At no point did more than 5% of the businesses employ more than 1000 people. Scale effects on the production side actually seem to be quite minimal.

Surprisingly, there are a startling number of different machines available nowadays; it seems that no two machines are alike.Every producer develops their unique "flair" and establishes their own market niches. Due to the prevalence of small businesses in the machine tool market, a phenomenon known as the disparity in mere size of machine tool enterprises and clients resulted. Machine tool companies now have little negotiating strength due to 20 years of industrial consolidation in the automotive and electronics sectors. Small businesses are in a particularly vulnerable situation when their customer and supplier are the same large industrial giant (like Siemens). These unique features of the machine tool industry and the market developments that precede and follow technological change opine that a closer examination of the impact of the adoption of numerical control (NC) is productive.

1.AN OUTLINE OF THE EQUIPMENTS BEARING

A bearing is a mechanism that enables controlled relative motion—typically rotation or linear movement—between two pieces. According to the motions they permit and their mode of action, bearings can be broadly categorised. Bearings with low friction are frequently necessary for effectiveness, to lessen wear, and to enable high speeds. In essence, a bearing can minimise friction by three different means: shape, material, or the introduction and containment of a fluid between surfaces. Gains advantage via shape, typically employing spheres or rollers.

1.2 ROLLER BEARING
For free motion in one dimension, a linear-motion bearing or linear slide is used. There are numerous varieties of linear motion bearings, and there are normally two sub-categories of these products:rolling-element and plane.

1.3 DRILLING TOOL
A cylindrical end-cutting instrument called a drill is used to create or expand circular holes in solid materials. Drills are typically rotated by a drilling machine and fed into stationary work, however on other types of machines, the drill and work may spin in opposing directions or a stationary drill may be fed into revolving work.

1.4 INDUCTION MOTOR
A type of alternating current motor known as an induction motor (or asynchronous motor) uses electromagnetic induction to supply power to the rotor. In its rotor (rotating component), an electric motor transforms electrical power into mechanical power. Power can be delivered to the rotor in a variety of ways. Unlike an induction motor, which induces power into the rotating object, a DC motor delivers power to the armature directly from a DC source. Because the rotor (the revolving part) is essentially the secondary side of the transformer and the stator (the stationary part) is its primary side, an induction motor is frequently referred to as a rotating transformer. The currents on the primary side cause a magnetic field, which interacts with the emf on the secondary side to create a torque, so acting to generate mechanical energy. Induction motors are frequently employed in industrial drives, particularly polyphase induction motors.

2. CONSTRUCTION
'Poles' made of wound wire make up the stator, which uses supply current to create a magnetic field that pierces the rotor. In a very simple motor, each pole would have a single projecting piece of the stator (a salient pole), with windings surrounding it. In reality, the windings are distributed throughout many slots around the stator to optimise the distribution of the magnetic field, but the magnetic field still has the same number of north-south alternations. 'Poles' can have a variety of numbers depending on the type of motor, but they are always in pairs (2, 4, 6, etc.). Although two-phase motors are also available, single-phase or three-phase power is most frequently used to power induction motors. Theoretically, two-phase and more than three-phase induction motors are feasible; in fact, many single- phase motors with two windings and a need for a capacitor can be thought of as two-phase motors because the capacitor creates a second power phase that is fed to a different motor winding at a 90° angle from the single-phase supply. Single-phase induction motors must have some sort of starting mechanism in order to establish a rotating field because single-phase electricity is more commonly available in residential buildings but cannot produce one (the field merely oscillates back and forth). Using the streamlined analogy of prominent poles, they would have one salient pole for every number of poles, for example, a four-pole motor would have four salient poles. A four-pole motor would have twelve salient poles since three-phase motors have three salient poles for every pole number. This enables the motor to generate a rotating field, which enables the motor to run more effectively than a comparable single-phase motor and start without the need for additional equipment.

III. CONCLUSION
The multi-functional machine is an advantageous asset for small-scale industries, with its the capacity to carry out several jobs and compact size. It has proven especially beneficial for

manufacturing in micro, small, and medium-sized enterprises with limited space availability. The impact of this machine has been significant, providing flexibility and increased productivity to businesses. The zinc oxide nanoparticle blended emulsified canola oil biodiesel was fuelled to the engine and the performance and characteristics were observed. The obtained results prove that the zinc oxide nanoparticle blended 100%biodiesel (NB100) can be used as an alternative fuel as it produces reduced (NOx, ,CO and HC) with improved efficiency when compared to that of ordinary diesel operation. From the performance characteristics obtained, it is observed that the zinc oxide nanoparticle blended biodiesel fuel performs with an improved efficiency when compared to ordinary biodiesel fuel. The zinc oxide nanoparticle blended 100% biodiesel NB(100) performs with higher brake thermal efficiency , higher indicated thermal efficiency, almost similar specific fuel consumption and mechanical efficiency when compared to an ordinary diesel operation performance. On the whole, it is concluded that the zinc oxide nanoparticle fuel will be a good alternative fuel for diesel engine. The project has been designed to perform different task in a single machine. Consequently, this project has had an effect on the manufacturing sector among small-scale industries. For the micro, small, and medium-sized businesses, having only the bare minimum of room to fit this machine in is quite useful.

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