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DESIGNING AND DEVELOPMENT OF MINI LATHE MACHINE FOR POWER SAVING

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ABSTRACT
Power Saving Devices Is Quite Helpful To Us In This Day And Age. An Electronic A.C. Motor Speed Regulator Is Being Used Here. The Motor's Fixed Speed Is Kept Constant With The Help Of This Regulator. This "POWER SAVING SYSTEM IN LATHE" Allows You To Adjust And Maintain A Consistent Speed In The Event Of Overload, Line Voltage Variations, Overvoltage, Surge Difficulties, Etc. Up To One Horsepower AC Motor Can Be Used With This Unit.

INTRODUCTION
Constant speed motors are best suited for several applications in the majority of a.c. Motor applications. Overload, variations in the input supply's line voltage, overvoltage, and frequency shifts all caused variations in speed. Surge issues, etc., are thus recommended as a solution for the above electronics control unit. These issues could lead to the motor's inability to regulate speed and reduced efficiency. This unit is utilized to keep the motor running at a steady speed in order to prevent these electrical issues. A.c. Motors with electronic digital speed control can be built affordably, guaranteeing automated speed regulation regardless of load circumstances. Essentially, though, we can establish the necessary constant speed with constant power. The motor's speed ranges from its lowest rated speed to its highest. Up to a 1 hp ac motor can be used with this unit. There is a regulating potentiometer with points for speed setting. Indicating the option that allows us to choose the motor's necessary speed based on its intended use

LATHE
The lathe is a machine tool that is mostly used for shaping metal objects (and occasionally wood or other materials). The lathe holds and rotates the work item while advancing a tool bit into the material to cut it. The fundamental lathe, which was created to cut cylindrical metal stock, has been improved upon to create crankshafts, drilled holes, tapered work, knurled surfaces, and screw threads. A standard lathe has the ability to move the cutting tool into the work piece both manually and automatically, and it can rotate at different rates. To repair and fabricate the necessary parts, machinists and maintenance shop staff need to be well-versed in the lathe's workings.

SIZES
The greatest piece of stock that can be machined determines the size of an engine lathe. The diameter of the work that will swing over the bed and the distance between the lathe centres must be measured before cutting a work piece.

CATEGORIES
It is simple to divide the different engine lathes into three groups based on subtle differences: gap lathes, also referred to as extension-type lathes, lightweight bench engine lathes, and precision tool room lathes. Figure displays these sorts of lathes. Different lathe categories may be used by different manufacturers.

LIGHTWEIGHT
Small lathes mounted on a bench or tabletop that have a swing of no more than 10 inches are called lightweight bench engine lathes. The majority of machining tasks may be completed by these lathes, yet their ability to turn larger materials may be restricted.

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PRECISION

Precision tool room lathes, also called standard manufacturing lathes, are utilized for all lathe operations, including radius forming, taper turning, drilling, reaming, producing screw threads, and turning. With the right fixture, they can also be modified for special milling operations. Workspaces up to 200 inches long and 25 inches in diameter can be handled by this kind of lathe. In general, though, the size is between 36 and 48 inches between centers, or roughly a 15-inch swing. Because tool room lathes are so accurate, they are frequently employed in the fabrication of special tools and dies.

FIG.NO.1 MINI LATHE MACHINE

Through accurate spindle control, this computerized control achieves significant energy economy. The spindle communicates its location to the computer, which then makes a comparison between this data and the spindle's expected location. The computer will instantly modify power drawn following the analysis. All of this happens instantly, and you wouldn't even be aware that it was changing. For instance, the computerized DVR motor controller at 2000 rpm calculates spindle position 400 times per second and makes minute adjustments at the same speed.The DVR motor only uses as much power as is required for the specific turning task at hand, adding or subtracting power as necessary to keep the spindle running at the proper speed. Almost no rotor losses are produced at low speeds.

Common DC and AC motors produce a lot of heat while operating at moderate speeds or with high loads. In addition to potentially burning out the wires, this heat wastes a significant amount of energy. DVR motors are powered solely by magnetic attraction. The motor can operate at a very low speed with great efficiency and safety while also having a high torque. Low heat production and excellent component reliability are the outcomes of this.

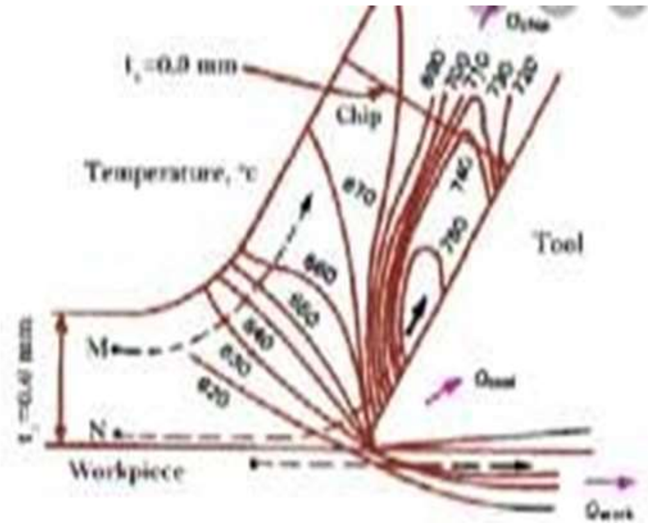

FIG.NO.4 CHIP REMOVAL ON WORK PIECE DURING TURNING OPERATIO

DIRECT DRIVE SYSTEM

Variable speed is also achieved by many other lathes through the use of an electronic or mechanical component. You might be unaware, though, that the lathe belt or gear system on these traditionally powered lathes can lose up to 20% of their energy. This indicates that the lathe spindle can only receive 1.6 HP of power from a 2 HP motor. Regretfully, the 0.4 HP of energy that your variable speed gadget lost means that you still have to pay your power bill.The DVR motor can operate effectively at low speeds and with large loads since it is a direct drive system. The belting system does not lose power, and it also gets rid of the vibration that comes from the belt and pulleys.

CONCLUSION

As a result, the power-saving technology has been developed and experimentally validated. The electrical power utilized by the lathe system will be reduced by over 20% thanks to this solution. This design is straightforward, profitable, and applicable to both small and large industries. In the future, more work has been done to address the constraint.

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