POWER SAVING SYSTEM FOR LATHE MACHINE

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ABSTRACT

In this modern world, the power saving system is help to us many purposes. Here we are using an electronic A.C motor speed regulator. This regulator is used to maintain the set speed of the motor constant. The speed variation due to over load, line voltage fluctuations, over voltage, surge problems etc. Can be controlled and the speed is maintained constant by using this "**POWER SAVING SYSTEM IN LATHE.** This unit can be used up to 1 H.P. A.C. motor.

INTRODUCTION

In most of the applications of A.C. motor constant speed is most suitable for many applications. Speed varied due to overload, line voltage fluctuations in the input supply, over voltage, changes in the frequency. Surge problems etc., Hence to overcome the above electronics control unit are suggested. These problems may cause poor speed regulation of the motor and also lesser efficiency. To avoid these problems electronic this unit is used to maintain a constant speed of the motor. Electronic Digital Speed control of A.C. Motor can be economically constructed ensuring the automatic speed regulation irrespective of load conditions however being essentially we can set the required constant speed with constant power. The motor speed can be from zero to maximum rated speed. This unit can be used up to 1HP A.C. Motor. For speed setting there is a regulating potentiometer with points for Indicating the setting we can select the required speed of the particular motor depends upon its purpose.

LATHE

The lathe is a machine tool used principally for shaping articles of metal (and sometimes wood or other materials) by causing the work piece to be held and rotated by the lathe while a tool bit is advanced into the work causing the cutting action. The basic lathe that was designed to cut cylindrical metal stock has been developed further to produce screw threads. tapered work. drilled holes. knurled surfaces, and crankshafts. The typical lathe provides a variety of rotating speeds and a means to manually and automatically move the cutting tool into the work piece. Machinists and maintenance shop personnel must be thoroughly familiar with the lathe and its operations to accomplish the repair and fabrication of needed parts.

SIZES

The size of an engine lathe is determined by the largest piece of stock that can be machined. Before machining a work piece, the following measurements must be considered: the diameter of the work that will swing over the bed and the length between lathe centres.

Categories

Slight differences in the various engine lathes make it easy to group them into three categories: lightweight bench engine lathes, precision tool room lathes, and gap lathes, which are also known as extension- type lathes. These lathe categories are shown in Figure Different manufacturers may use different lathe categories.

Lightweight

Lightweight bench engine lathes are generally small lathes with a swing of 10 inches or less, mounted to a bench or table top. These lathes can accomplish most machining jobs, but may be limited due to the size of the material that can be turned.

PRECISION

Precision tool room lathes are also known as standard manufacturing lathes and are used for all lathe operations, such as turning, boring, drilling, reaming, producing screw threads, taper turning, knurling, and radius forming, and can be adapted for special milling operations with the appropriate fixture. This type of lathe can handle workplaces up to 25 inches in diameter and up to 200 inches long. However, the general size is about a 15-inch swing with 36 to 48 inches between centers. Many tool room lathes are used for special tool and die production due to the high accuracy of the machine.

Fig.No.1)https://m.indiamart.com/proddetail/center-lathe-machine-11796223233.html

HOW IT CAN SAVE ENERGY

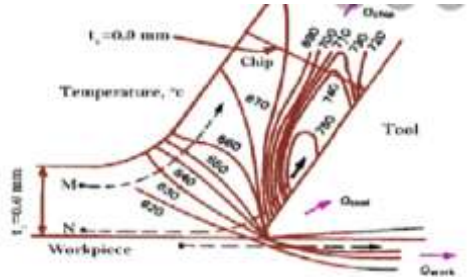
SMART CONTROL

This computerized control delivers high energy efficiency through precise control of the spindle. The spindle reports to the computer where it is and the computer compares this information with where the spindle is supposed to be. After the analysis, the computer will instantly adjust power drawn. This is all done instantaneously, you wouldn't be aware of this adjustment occurring. For example, at 2000rpm, computerized DVR motor controller is calculating spindle position at 400 x a second, and minutely adjusting just as fast.The DVR motor only draws as much power as it needs for each particular turning project and provides more or less power as needed to maintain the spindle in the correct speed. At low speed, almost no losses in the rotor are generated.Fig.No.2)https://m.alibaba.com/product/60397428549/Horizontal-CNC-Lathe-Machine-Price-CK6150D.html

Less heat generation

Ordinary DC and AC motors generate lots of heat in low speed or when under heavy load. This heat not only can burn out the wires but also wastes lots of energy needlessly. DVR motor works by pure magnetic attraction. The motor can safely and efficiently work in very low speed and have high torque at the same time. This results in low heat generated and high component reliability.

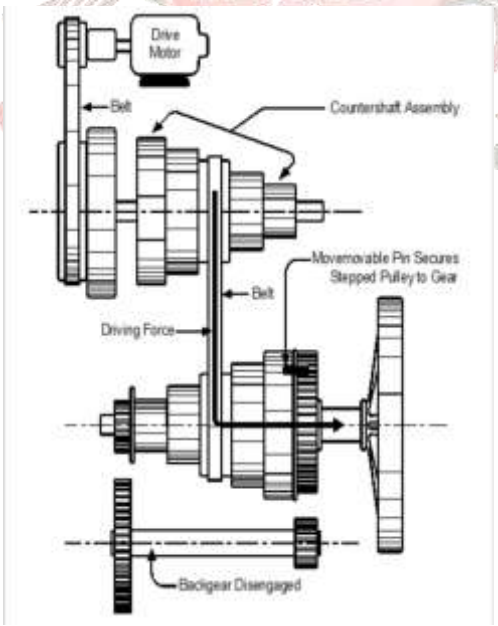
Fig.No.3)https://www.semanticscholar.org/paper/A-Review-on-Heat-Generation-in-Metal-Cutting-Pradeepkumar-Amarnath/37be719799dbb1f6de024095512074e6c996e91d



DIRECT DRIVE SYSTEM

Many other lathes also achieve variable speed by using an electronic or mechanism device. However, you may not know that these conventionally driven lathes are losing up to 20% of energy through the lathe belt or gear system.This means a 2 HP motor can only deliver 1.6HP energy to the lathe spindle. Sadly, you still need to pay your power bill for the 0.4HP energy lost in your variable speed device.Because the DVR motor is a direct drive system, it can work efficiently in low speed and with heavy loads. There is no power loss through the belting system and this system also eliminates the vibration caused by the belt and pulleys.

Fig.No.4)https://www.metalartspress.com/books/chapters/chapter-7-lathes



CONCLUSION

Thus the power saving system has been designed and it is verified experimentally. This system will save the electrical power used for the lathe system almost 20%.This is an simply and economically beneficial design and can be used for all small and large scale industry. Further work has been continued in the future to rectify the limitation.

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