

Spherical Turning Attachment

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ABSTRACT

On lathe machine it is not possible to manufacture spherical objects but with the help of spherical turning attachment it can be easily manufacture. Earlier the spherical objects were made by various processes like annealing, wire drawing, cold forging, flashing, heat treatment, grinding, lapping etc. but this process were tedious, time consuming and comparatively cost of this process is high. The movement of tool post on normal lathe machine is restricted in only two directions, by replacing the tool post with spherical turning attachment the rotating motion can be achieved of about 360°. The machine named ball turner which is available in the market for manufacturing spherical objects cost very high

Keywords: Turning Attachment , Lathe Machine , Multipurpose Tool Post , Etc

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I. INTRODUCTION

One of the practically it is not possible to get elliptical or exactly curved profile on convectional lathe machine using regular tool post or tool holder. for getting different size or shapes form on lathe it is not possible for doing various job or work or product must use the different machining eg conical, trapezoidal, elliptical, spherical, hemispherical, forming, mandrill handle, For getting solution on this industrial problem we design and developing such kind of tool post in which with help of this do maximum job and verity of job on simple lathe machine. This attachment provide the facility on same machine i.e. avoid necessity of special purpose machine, then it will be beneficial. So we can found that this type of attachment helps us while machining complex elliptical as well as spherical profile such as circular ball. This attachment only holds and positions the work , but doesn't itself guide, locate or position the cutting tool. This attachment of tool post which used to facilitate production when work pieces are to be produced on mass production, batch production, job production in verity . The mass production of work pieces is based on the concept of interchangeability according to which every will be produced with an establish tolerance.

II. LITERATURE REVIEW

Dr. Haresh P. Patolia [1] et al. explained that the machine tool-bed structure has a great influence on the overall

performance of a machine. With the development of high speed and high precision of CNC machine, the requirements of the static and dynamic performance of the machine tool structural components have become more significant. The two functional requirements of machine tool bed for machine tools are high structural stiffness and high damping. The previous work has been done on individual component and supporting structure by some researchers. Here, any individual component plays an important role and have a great influence on productivity and quality of product. In this review paper, the previous work will be discussed related to design of machine tool structure and its components.”

Mr. Prakash N. Parmar [2] et al. states that now a day, products can be produced by modern technology, which uses computer software, hardware and firm ware in industries. It is needed to use CNC lathe machine to get more accurate dimensions and irregular shape. So, CNC machines are becoming more and more important in modernized industrialization. There are many conventional lathe machines in our country. To build a new modern developed country, it is required to convert these conventional lathe machines into semi-automatic control lathe machine by retrofitting. Developing and changing into semi-automatic control lathe machine, there are three required portions, namely, mechanical electronics and hydraulic. In this project we convert the convention lathes which have 5ft bed length in to the semi-automatic lathe. In

mechanical side we replace the ball screw in place of lead screw for better accuracy and remove some unnecessary component like gears for providing space for motors. We add an extra plates or structure for installation of motors. Also provides a hydraulic circuit for coolant. In electronic side we used a servo/ stepper motor for both Z and X axis and provide controller for the efficient operation

Miss. Jahnavi Madireddy [3] et al. studied on "The lathe, probably one of the earliest machine tools, is one of the most versatile and widely used machine tool, so also known as mother machine tool. An engine lathe is the most basic and simplest form of the lathe. It is called so because in early lathes, power was obtained from engines. The job to be machined is held and rotated in a lathe chuck; a cutting tool is advanced which is stationary against the rotating job. Since the cutting tool material is harder than the workpiece, so metal is easily removed from the job. Some of the common operations performed on a lathe are facing, turning, drilling, threading, knurling, and boring etc"

Mr. Diptesh Patel [4] et al. explained that "Country's GDP is largely affected by many small scale industries. Also, we saw that in this fast moving world a micro industries are facing very tough competition from large scale industries and it's almost very difficult for them to survive and earn their share of bread and butter as they have an only choice of selecting one or two machine at a time due which there is a rise of a serious problem called as either sub contraction or renting of machines which further decreases the overall efficiency of whole machine and industry. By selecting and incorporating such small but useful ideas a small scale industrialist can save huge amount of time, energy, and money hence forth increasing the overall productivity of a firm and hence contributing more efficiently in countries GDP".

III. PRINCIPAL OF WORKING

The working of spherical turning attachment is quite simple. We can obtain different shapes such as spherical, elliptical with the help of the axis of the job which will be held in the chuck, through the axis of the tool point and the axis of the circular plate. When both the axis is in line, then we lock both the sliding. Now, the complete work will depend upon the attachment. When the job is rotating in a chuck with the help of motor. Generally in lathe machine the depth of cut is given by tool which is held above the circular plate & the turning operation is done by rotating the lever which is mounted on the circular plate. In other words, we have to match the axis as per our requirement. For to get elliptical shape we have to give some offset to axis. The offset can be given as per requirement. The most important thing while working on this attachment is that we have to groove the amount of length as equal to the diameter needed, so that the circular plate rotate fully. To get shape of hemisphere we have to rotate upto 90° and to get the whole sphere we have to rotate till the angle reaches to 180°. We can obtain the range of diameter between 25mm to 80mm. This can be achieved by sliding the tool holder in the slot of the circular plate. To get the diameter more than the range, we can design another tool holder as per requirement of the industry. The is fixed by tightening the In key which is present on the circumference of the circular plate. It is easy to obtain a

convex surface also with this attachment. In this case the axis of the tool point tip will be behind the axis of the circular plate. So that when we move the lever it will cut in the convex manner or in a convex shape with the tool point. On the job which will be held in the chuck. But the axis of the job must be in line with the axis of the tool point so that we can get a proper convex shape as a mirror image. And the remaining working procedure is same of the attachment.

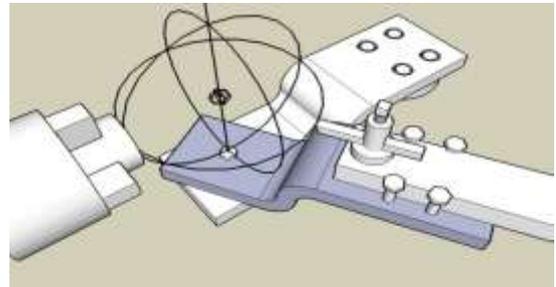


Fig. 1 axis of tool post rotation

DESIGN METHODOLOGY

- PROBLEM DEFINATION
- RESARCH ON VARIOUS TOOL POST
- LITARATUR REVIW
- MODEL DESIGNE
- ANALYSING VARIOUS PARAMETER AFFECT

Forces analysis, other cutting parameter ETC.

- GEOMETRICAL PARAMETER

Various dimension's of all part's

- DESIGN WITH PROPER DIMENSION

Design in softwear with dimension

- FABRICATION

Fabricating all parts & assembly of all part

- RESUTS & ANALYSSIS

Dimensional Details

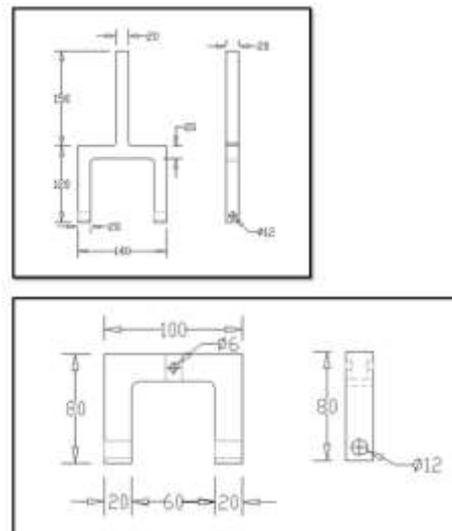


Fig.2. overall dimensional

IV. BENEFITS

Cylindrical shape objects can manufacture easily. Concave and convex type design can be given to the component. Can be implemented on every lathe machine in college at cheap cost

V. SCOPE FOR FUTURE

Spherical objects can be easily made with this attachment also semi skilled worker can be able to operate. Cylindrical shape objects can manufacture easily. Can be implemented in engineering institutes for educational purposes.

VI. CONCLUSION

Cylindrical shape objects can manufacture easily. Concave and convex type design can be given to the component. Can be implemented on every lathe machine in college at cheap cost. A complete analysis of total force acting on tool as well as work piece can be done. The attachment which is available in the market is costlier than our attachment. Accuracy is equal to 0.4 which is enough to have finished surface. It can obtain diameter range 25mm to 80mm.

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