

Research and Design of Simple Variable Diameter Heart Carrier

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Abstract

In the ordinary lathe and ordinary cylindrical grinder of shaft parts processing using double core clamper clamping, to use heart carrier sleeve at the end of the workpiece, machine tool chuck toggle heart carrier also drives the workpiece with rotation. heart carrier to be processed according to the outer diameter of the workpiece to the specifications of the heart carrier, this heart carrier of the many kinds of specifications, site management complex. Is introduced in this paper a adjustable chuck, greatly increased the scope of application of the clamping of the workpiece diameter, the following of this adjustable chuck structure device are introduced.

Keywords

Cylindrical grinder;Carrier;Variable diameter;Clamping;Clamp.

1. Introduction

In the actual machining process, the heart carrier is auxiliary fixture for machining shaft parts, mainly through a spindle head installation chuck toggle heart carrier to rotate, because the heart carrier tightly clamped in the workpiece, the workpiece is with chuck rotate together. This method is used in the processing of clamping cylinder (or long rotation) parts, such as the long screw, light bars etc.. The heart-shaped clip is according to the determined by the outer diameter of the workpiece, found in many of the chuck is suitable. That is to say chuck in machining to be equipped with different size is very troublesome, very messy, auxiliary time is long. If there are not appropriate to re processing of a new specification of chuck, so that the production efficiency is low, chuck with too many kinds, daily management of the trouble.

Aiming at the existing problems of the heart-shaped chuck, a heart-shaped adjustable chuck. By using the basic principle of the worm gear in the mechanical transmission, the size of the angle of the worm arm is adjusted, and the diameter of the workpiece can be processed in a certain range. In order to achieve in the existing problems in the heart-shaped chuck is very necessary.

2. Variable Diameter Heart Carrier Outline of Design Scheme

Carrier Structure Such as Figure 1 and Figure 2 shows a Variable Diameter Heart Carrier structure, including: single arm worm-wheel arm 8, forked worm-wheel arm 9 and worm 7, the worm 7 rotating gearing single arm worm-wheel arm 8 and forked worm-wheel arm 9, change worm wheel arm 8 and forked worm-wheel arm 9 of angle. The rotating handle 2 is fixed on the end of the worm 7 through a screw 5; The supporting plate 10 is provided with a supporting screw 1 for fixing the workpiece, single arm worm-wheel arm 8, forked worm-wheel arm 9 and supporting screw 1 contact the workpiece in the space of three different directions at least 3 points, they can effectively fix the workpiece; the worm 7 in order to be able to accurately and stably drive single arm worm-wheel arm 8 and forked worm-wheel arm 9, the rolling bearing 4 to support the worm 7, close the worm 7 and the inner ring of the rolling bearing 4. The outer ring of the rolling bearing 4 is matched with the hole of the side of the supporting plate 10. The bearing cover 3 is fixed on the supporting plate 10 by a screw in the axial direction of the rolling bearing 4;

Single arm worm-wheel arm 8, on both sides of the forked worm-wheel arm 9 installed tensile spring 6, mainly is to can eliminate worm 7 respectively with single arm worm-wheel arm 8, forked

worm-wheel arm 9 in the transmission of the gap, one end of the tension spring 6 screws 5 fixed on the supporting plate 10, one end fixed in angle worm-wheel arm 8, forked worm-wheel arm 9; The rotating handle 2 is fixed on the end face of the worm through a screw 5, and a non slip rolling flower is processed on the outer surface of the rotary handle 2, and the user is convenient to rotate and rotate the handle;

At the end of the supporting plate 10 installed forked worm-wheel arm 9, installed at the other end of single arm worm-wheel arm 8, workpiece is fixed at both ends of the single worm-wheel arm 8, forked worm-wheel arm 9 and folded, single worm-wheel arm 8 inserts in forked worm-wheel arm 9, this fixed workpiece single arm worm-wheel arm 8, forked worm-wheel arm 9 clamping force is not easy to obliquely; at both ends of the angle worm-wheel arm 8, forked worm-wheel arm 9 by pin 12 fixed on the supporting plate 10 and to pin 12 is the center of rotation;

Concrete implementation content Rotation around the two rotary handle 2 single arm worm-wheel arm 8 and forked worm-wheel arm 9 open, the workpiece is put into the single arm worm-wheel arm 8 and forked worm-wheel arm 9, let the workpiece top 11 on the bearing screw 1, then rotate around the two rotary handle 2 single arm worm-wheel arm 8 and forked worm-wheel arm 9 cross synthetic on, t single arm worm-wheel arm 8, forked worm-wheel arm 9 and supporting screw 1 and is in contact with the workpiece, wrap the workpiece. This can also support 1 fastening screw rotation, the clamping force is enhanced, to avoid the slip in the chuck.

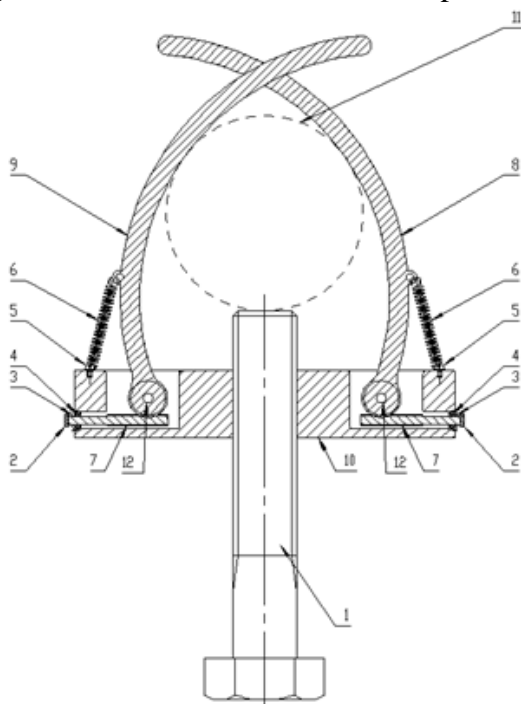


Figure 1

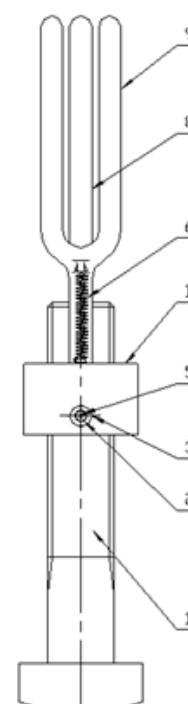


Figure 2

3. The advantages of this design

The advantages of this design scheme are obvious, mainly in:

The design scheme can adapt to a wider range of shaft diameter of workpiece clamping, fewer types of chuck, saving general chuck storage space and easy parts management.

The design scheme, the worm and worm gear transmission principle and the structure of itself with self-locking performance. In other words, the only worm worm gear, worm gear is not worm drive, so you can more effectively the work held, prevent processing between the workpiece and the clamping head loose.

The design scheme can adjust the angle of the worm wheel arm opening, the suit is flexible, convenient and quick, save time, improve production efficiency.

4. Development trend of small auxiliary tools for mechanical processing

Now processing machinery auxiliary tools including a lot of content, involved with manual, electric, pneumatic, tools, accessories and so on many of the content, and lathe chuck is manual small auxiliary tools. At the same time, some small auxiliary tools more in the stone, automobile manufacturing and other fields are widely used. The demand of the present market and the fierce competition of the industry stimulate the enterprise to continuously improve the quality of products, continuous innovation, and management technology to meet the needs of customers. The improvement and optimization of small auxiliary tools is also one of the breakthrough to improve the quality of products and improve the production efficiency. Now the small auxiliary tools to gradually present the development trend of series, scale and standardization. And there is also a part of high quality products are favored by foreign enterprises, so as to provide more space for the development of these small auxiliary tools and broad development of the future.

5. Summary

Rotary parts machining in order to ensure the precision of the parts of the rotation, the use of double top positioning method, can overcome the impact of external factors on the accuracy of the workpiece, improve the precision of the parts. And lathe chuck is also the location indispensable auxiliary tool and optimization to improve the structure of the lathe chuck, but also improve the machining precision of the parts of one of the ways. With the continuous development of modern machinery processing industry and innovation, to mechanical designers put forward higher requirements, give full play to their imagination, combining theory and practice, design and create a better and more practical and more convenient mechanical tools for the development of mechanical processing industry to make its own contribution.

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