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### RESEARCH ON A NEW TYPE OF CENTRIFUGAL LATHE FIXTURE

When machining small and medium-sized shaft parts on a lathe, the following problems are often encountered:

1. The center chuck of the three-jaw automatic positioning shaft is used to install the fixture on the ordinary lathe, and it needs to be started, closed and released repeatedly [1].

It is troublesome to lock the workpiece with a fixture. When used for multi-fixture assembly or precision turning, the workpiece installation error is relatively large, the required time is long, and the labor intensity of the workers is high.

2. The use of centrifugal force lathe fixtures can greatly shorten the installation time. However, the centrifugal force fixture that usually uses three sets of counterweights and levers for external automatic centering of the workpiece will produce larger axial positioning errors [2], and the centering accuracy is low.

3. The centrifugal force fixing device used to load and unload the workpiece with the opposite center and the center of the outward bending is easy to damage the end surface of the workpiece.

4. Many existing lathe fixtures use electromagnetic or hydraulic devices to provide power [3], which consumes energy and easily causes environmental and safety issues.

A new type of centrifugal clamping device can be designed to make the lathe centrifugal clamping device work safely and reliably, and solve the problem of frequent opening and closing of the universal chuck. The traditional centrifugal clamping device cannot automatically determine the center of the spindle, and the centrifugal force disappears when it stops.

The main shaft drives the main body of the fixture to rotate, the counterweight generates centrifugal force [4], and the lever swings to make the claw clamp the workpiece radially. At the same time, the control rod drives the sliding block to move to the left, and the centering device eliminates the unbalance factor to ensure that the jaws automatically clamp the middle workpiece.

The slider moves to the left. Under the action of the spring, the positioning rod is positioned and clamped [5] to ensure that the sliding rod will not be reset due to the loss of centrifugal force when stopping, thereby causing the workpiece to loosen.

When the needle rotates to a certain angle, the wedge-shaped block at the front end of the positioning rod does not contact the slider. Under the action of the return spring, the slider and lever remove the workpiece, pull it out, and then pull it out [6]. Then reset clockwise, and the jaws release the workpiece. Reset the handle, place it in the fork, and maintain this position during turning.

Most shaft parts have very low requirements on the roughness and position of the end face. Therefore, when the end drive center is used for installation, it is inevitable to leave a dent on one end surface of the workpiece. Generally, parts with dents on the end face are allowed.

Use a centrifugal clamping lathe fixture designed to apply pre-tightening force and automatically determine the shaft, and the clamping force is basically constant during the machining process [7]. First of all, it can realize the centrifugal force clamping of the workpiece and shorten the time required for assistance. The second type is a self-locking mechanism with an inclined wedge design, the centrifugal force will not disappear when parking. The third is that the three spindles on the main body of the fixture support three sets of levers and weights, and the spherical sleeve and spherical washer can realize automatic centering [8]. The fourth is that the first and second return springs make it more convenient to lock and unload the workpiece. At the same time, the structure is simple, the use is convenient and reliable, and the scope of application is large.

The clamp solves the problem that the centrifugal force clamp in the prior art does not have a self-locking mechanism [9] and the centering accuracy is not high. At the same time, the problem that the end face of the workpiece is easily clamped by the centrifugal force clamp with the end face reversed is also solved. The clamp adopts centrifugal force to clamp the workpiece, with simple structure, high positioning accuracy, convenient and reliable clamping, and low cost; it is suitable for batch processing of small and medium-sized parts in various manufacturing enterprises.

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### **МОБІЛЬНИЙ РОБОТ З ГЕНЕРАТОРОМ АЕРОДИНАМІЧНОЇ ПІДНІМАЛЬНОЇ СИЛИ**

Мобільні роботи довільної орієнтації (МРДО) відомі в закордонних публікаціях як Climber Robot (альпіністський робот) [1, 2, 4, 6], призначені для виконання технологічних операцій в екстремальних умовах виробництва, у тому числі й техногенних катастроф,