The device which is suitable for simulating the working movement track of a kitchen water TAP

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Abstract: In this paper, a mechanical device is introduced, which changes the driving direction of the force through a conical gear, so as to achieve the goal of simulating the actual working state of the kitchen water TAP and improve the accuracy of detection.

1 Background Technique

Water Tap has been widely used in public places, office places, families and so on, has become an indispensable daily life of water appliances. The water consumption, sensitivity and durability of the water TAP are important indexes to evaluate its quality, the sensitivity of the water nozzle is to evaluate the influence of the rotation angle of the ceramic disc in the valve core of the single-handle double-control ceramic disc seal on the water temperature. At present, there are more than 1500 enterprises in China, small and medium-sized private enterprises accounting for more than 85% of the total output, and the production level is uneven. The sensitivity is an important index. Consumers often report that hot and cold water is not easy to control, causing users to spend a long time to regulate the water temperature, and in severe cases, there will be scalds, which have a great impact on people's quality of life. Therefore, this index, both Chinese or foreign standards, are very important performance indicators.

2 Principle structure

The device consists of a height adjusting device, an action executing device and a water TAP clamping device.

The height adjusting device consists of a handwheel, a trapezoidal lead screw, a guide rod, a slide block, a fixing plate and a bearing with a seat. The trapezoidal lead screw is installed on the fixing plate by the bearing with a seat, and the slide block and the guide rod are connected together by the slide block. The Height adjustment function is realized by turning the handwheel to move the

slide block up and down on the trapezoidal lead screw.

The action executing device consists of a servo motor, a motor seat, a connector, a motor connecting shaft, a bearing seat, a rotating shaft, an upper bearing plate seat, a lower bearing plate seat, an upper bevel gear, a lower bevel gear and an output shaft. The original power is provided by the rotation of the servo motor, the upper bevel gear is driven by a motor connecting shaft and a rotating shaft, the upper bevel gear engages with the lower bevel gear to drive the lower bevel gear. The lower bevel gear is connected with the output shaft to drive the rotation of the output shaft. Finally, the rotating motion is transformed into the straight line motion, and the movement track of the kitchen water nozzle is simulated.

The water TAP clamping device consists of a connecting plate, a faucet clamping block, a guiding shaft and a side baffle. By using a faucet clamp block to realize the fixing and clamping of a kitchen water TAP. The Faucet clamp blocks slide up and down freely on the guide shaft to prevent the kitchen water TAP from being stuck in the course of movement and realize the installation and clamping function of the kitchen water TAP.

3 Working Process

(1) The handle of the kitchen tap is arranged on the faucet clamp block, and the height is adjusted by turning the handwheel so that the faucet clamp block is completely clamped without loosening the handle.

(2) Start the Servo Motor, drive the kitchen water TAP to rotate through the action actuator, and realize the simulation of its working movement track.

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Fig 1. Structural drawing of the installation

1 servo motor, 2 handwheel, 3 trapezoidal lead screw, 4 guide rod, 5 Slide rod, 6 fixing plate, 7 bearing with seat, 8 motor seat, 9 connector, 10 motor connecting shaft, 11 bearing block, 12 rotating shaft, 13 upper bearing block, 14 lower bearing block, 15 upper bevel gear, 16 lower bevel gear, 17 output shaft, 18 Connection Plate, 19 faucet clamp block, 20 guide shaft, 21 kitchen water TAP, 22 side baffle.

Fig 2. Left view of the installation

Fig 3. Vertical view of the installation

4 Summarise

By means of bevel gear, the rotating motion of the motor is converted into linear motion, the whole motion process is smooth without stagnation. So that the kitchen water TAP sensitivity testing, durability testing and other testing items can fully meet the requirements of the standard for its installation mode no longer have differences and disputes on the installation mode, filling the gap in this regard.

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