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**Snap spring assembling device for disc spring**

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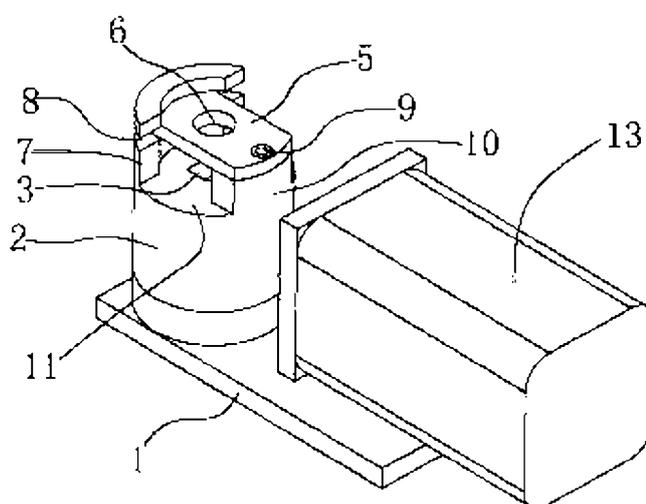
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## Abstract

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The invention relates to a snap spring assembling device for disc spring, belonging to the technical field of leaf spring mounting devices. The snap spring assembling device comprises a bedplate, a positioning seat is fixedly mounted on the bedplate, the positioning seat is provided with a positioning hole in which a lifter is arranged, the lifter is connected with a lifting drive mechanism, one side of the upper end of the positioning seat is articulated to one end of the press plate, the other side of the upper end of the positioning seat opposing to the articulated part of the upper end to the press plate is provided with a limiting structure, and the press plate is provided with a through hole at the middle part. When the other end of the press plate is fitted with the limiting structure, both ends of the press plate can not move up and down due to the limitations of the articulated part and the limiting structure, respectively. The snap spring assembling device for disc spring is convenient for assembling a snap spring on a shaft assembled with a disc spring and can not damage the disc spring or the shaft.



## Description

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### SNAP SPRING ASSEMBLING DEVICE FOR DISC SPRING

#### Technical field

The invention relates to a snap spring assembling device for disc spring, belonging to the technical field of leaf spring mounting devices.

#### Background art

After a disc spring is mounted on various shafts, a snap spring needs to be disposed at the position of the shaft adjacent to the end surface of the disc spring to limit the axial displacement of the disc spring. The disc spring usually occupies the position of a snap spring slot for mounting the snap spring because of the axial deformation of the disc spring, so when the snap spring is mounted, the disc spring needs to be axially compressed to free the position of the snap spring slot for mounting the snap spring such that the snap spring can be mounted. The disc spring usually has strong axial spring force, so the snap spring can be assembled by applying an even axial force to the disc spring to completely free the annular snap spring slot on the shaft. There is no special snap spring assembling device for axially compressing a disc spring to free a snap spring slot for snap spring assembly in the prior art, which makes it is hard to assemble a snap spring for a disc spring and possibly damage the disc spring or the shaft.

#### Summery of the invention

The invention solves the problem in the prior art that a snap spring is difficult to be assembled on a shaft on which a disc spring is mounted and provides a snap spring assembling device for disc spring convenient for assembling a snap spring on a shaft on which a disc spring is mounted and can not damage the disc spring or the

shaft.

The above technical object of the invention is realized by the following technical scheme: the snap spring assembling device for disc spring comprises a bedplate, a positioning seat is fixedly mounted on the bedplate, the positioning seat is provided with a positioning hole in which a lifter is disposed, the lifter is connected with a lifting drive mechanism, one side of the upper end of the positioning seat is articulated to one end of a press plate, the other side of the upper end of the positioning seat opposing to the articulated part of the upper end to the press plate is provided with a limiting structure, the press plate is provided with a through hole at the middle part, and when the other end of the press plate is fitted with the limiting structure, both ends of the press plate can not move up and down under the restrictions of the articulated part and the limiting structure, respectively. In assembly, rotor shaft assembled with a disc spring or other workpiece shaft is positioned in the positioning hole of the positioning seat and supported on the lifter, then the press plate rotates around the articulated point to fit the other end of the press plate with the limiting structure, the press plate stops rotating when the through hole at the middle part of the press plate is coaxial with the positioning hole of the positioning seat, and both ends of the press plate can not move up and down due to the restrictions of the articulated part and the limiting structure, respectively; the lifting drive mechanism drives the lifter to rise, the rotor shaft assembled with the disc spring or other workpiece shaft is accordingly brought about to rise, the disc spring can not rise due to the limitation by contacting with the lower surface of the press plate, the position of a snap spring slot on the rotor shaft or other workpiece shaft for mounting a snap spring adjacent to the disc spring is completely free, the snap spring can be conveniently assembled in the snap spring slot by a snap spring plier, then the lifting drive mechanism drives the lifter to fall, the rotor shaft or other workpiece

shaft moves back downward to finish the assembly of the snap spring, and the assembly is convenient for operation and can not damage the disc spring or the shaft.

Preferably, the lifting drive mechanism is a cylinder arranged under the lifter, and the piston rod of the cylinder is connected with the lifter. The cylinder is taken as the lifting drive mechanism by directly and fixedly connecting the piston rod of the cylinder to the lifter without other intermediate transmission members.

Preferably, the lifting drive mechanism is of a gear-rack structure, the rack of the gear-rack structure is fixed to the lifter and is parallel to the axes of the positioning hole in the length direction, the gear of the gear-rack structure is meshed with the rack, and the gear is driven by a drive motor.

Preferably, the lifting drive mechanism has the following structure: a drive motor is disposed on the bedplate, the lifter is directly or indirectly supported on a feed screw nut which is fitted with a screw rod, the screw rod is connected with a worm wheel via a shaft sleeve, the output shaft end of the drive motor is provided with a worm screw, and the worm screw is inserted into the positioning seat and in a transmission fit with the worm wheel. The stepless lifting of the lifter can be realized by using the screw rod to lift the lifter, so the lifting height of the lifter can be accurately controlled easily.

Preferably, the press plate is arranged horizontally.

Preferably, the other side of the upper end of the positioning seat opposing to the articulated part of the upper end to the press plate forms a first bulge which is higher than the articulated part of the upper end of the positioning hole to the press plate, the limiting structure is a cambered horizontal groove on the inner wall of the first bulge, and the cambered horizontal groove is fitted with the free end of the press plate. The first bulge formed on the upper end of the positioning seat and the

cambered horizontal groove formed on the inner wall of the first bulge can facilitate the fit between the press plate and the cambered horizontal groove, which is inconvenient for operation. The limiting structure can be of the following structure: the upper end of the positioning seat is provided with a threaded hole, the press plate is provided with a through hole corresponding to the threaded hole, a lock screw penetrates through the through hole to fitted with the threaded hole of the upper end of the positioning seat and thus lock the press plate.

Preferably, the articulated part of the upper end of the positioning seat to the press plate forms a second bulge, the end part of the press plate is articulated with the upper end of the second bulge, and the upper end of the positioning seat is provided with a first notch and a second notch which are positioned between the first bulge and the second bulge in the circumferential direction. The first notch and the second notch formed between the first bulge and the second bulge can facilitate the press plate to move out of any end of the cambered horizontal groove, which is convenient for operation.

Therefore, the invention is convenient for assembling a snap spring on a shaft assembled with a disc spring and can not damage the disc spring or the shaft.

#### **Brief description of the drawings**

Figure 1 is a perspective view of the structure of the invention;

Figure 2 is a top view of the structure of the invention;

Figure 3 is a schematic diagram of an attached controller of A-A view; and

Figure 4 is an exploded perspective view of the structure of the invention.

#### **Detailed description of the embodiment**

The technical scheme of the invention is further described in details by combining the following embodiment and figures.

Embodiment: referring to figure 1, figure 2 and figure 3, a positioning seat 2 is fixedly mounted on a bedplate 1, the positioning seat 2 is provided with a vertical positioning hole 3 in which a lifter 4 is disposed, the lifter 4 is connected with a lifting drive mechanism, one side of the upper end of the positioning seat 2 is articulated to one end of a press plate 5, the press plate 5 is arranged horizontally, the other side of the upper end of the positioning seat 2 opposing to the articulated part of the upper end to press plate 5 is provided with a limiting structure, and the middle part of the press plate 5 is provided with a through hole 6. The part of the upper end of the positioning seat 2 articulated to the press plate 5 forms a second upper bulge 10, and the end part of the press plate 5 is articulated to the upper end of the second bulge 10. The other side of the upper end of the positioning seat 2 opposing to the articulated part to the press plate 5 forms a first bulge 7, the first bulge 7 is higher than the articulated part 9 of the upper end of the positioning hole 3 to the press plate 5, the limiting structure is a cambered horizontal groove 8 formed on the inner wall of the first bulge 7, and the upper end of the positioning seat 2 is provided with a first notch 11 and a second notch 12 which are positioned between the first bulge 7 and the second bulge 10 in the circumferential direction. When the other end of the press plate 5 is positioned in the cambered horizontal groove 8, both ends of the press plate 5 can not move up and down under the restrictions of the articulated part 9 and the cambered horizontal groove 8, wherein when the end part of the press plate is positioned in the middle of the cambered horizontal groove 8, the through hole 6 at the middle part of the press plate is coaxial with the positioning hole 3 of the positioning seat 2.

As shown in figure 2, figure 3 and figure 4, the lifting driving mechanism has the following structure: a drive motor 13 is disposed on the bedplate 1, the lifter 4 is supported on a feed screw nut 15 via a jacking pipe 14, the feed screw nut 15 is

provided with a guide part 16 fitted with the inner hole of the jacking pipe 14, the external diameter of the guide part 16 is smaller than the external diameter of the feed screw nut 15, the lower end of the jacking pipe 14 contacts with the upper end of the feed screw nut 15, the feed screw nut 15 is fitted with a screw rod 17 which is connected with a worm wheel 19 via a shaft sleeve 18, the end part of the screw rod 17 is integrally provided with a spline shaft 20, an outer spline surface 21 is machined on the spline shaft 20, the shaft sleeve 18 is provided with a shaft hole 22, the inner wall of the shaft hole 22 is provided with an inner spline surface 23 fitted with the outer spline surface 21 of the spline shaft 20, the spline shaft 20 is inserted in and fitted with the shaft hole 22, the lower end of the shaft sleeve is tightly fitted in the central hole of the worm wheel 19, the parts of the shaft sleeve corresponding to both end surfaces of the worm wheel 19 are respectively provided with an upper bearing 24 and a lower bearing 25, a rotary support is formed between the screw rod 17 in connection with the worm wheel 19 and the positioning seat 2 via the upper bearing 24 and the lower bearing 25, and the output shaft end of the drive motor 13 is provided with a worm screw 26 which is inserted into the positioning seat to be in a transmission fit with the worm wheel.

In assembly, a rotor shaft provided with a disc spring or other workpiece shaft is positioned in the positioning hole of the positioning seat and supported on the lifter, then the press plate rotates around the articulated part to fit the other end of the press plate with the cambered horizontal groove, the press plate stops rotating when the through hole at the middle part of the press plate is coaxial with the positioning hole of the positioning seat, and both ends of the press plate can not move up and down due to the restrictions of the articulated part and the limiting structure, respectively; the drive motor is transmitted with the worm wheel via the worm screw of the output shaft, the worm wheel rotates together with the worm screw, the screw rod is fitted

with the feed screw nut, the feed screw nut axially rise to push the jacking pipe to lift, the jacking pipe props the lifter up, so the rotor shaft assembled with the disc spring or other workpiece shaft is lifted with the lifter, the disc spring can not rise due to the limitation by contacting with the lower surface of the press plate, the position of a snap spring slot on the rotor shaft or other workpiece shaft for mounting a snap spring adjacent to the disc spring is completely free, the snap spring can be conveniently assembled in the snap spring slot by a snap spring plier, then the lifting drive mechanism drives the lifter to fall, the rotor shaft or other workpiece shaft moves back downward to finish the assembly of the snap spring, and the assembly is convenient for operation and can not damage the disc spring or the shaft.

## Claims

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1. A snap spring assembling device for disc spring, comprising a bedplate, characterized in that a positioning seat is fixedly mounted on the bedplate, the positioning seat is provided with a positioning hole in which a lifter is disposed, the lifter is connected with a lifting drive mechanism, one side of the upper end of the positioning seat is articulated to one end of a press plate, the other side of the upper end of the positioning seat opposing to the articulated part of the upper end to the press plate is provided with a limiting structure, the press plate is provided with a through hole at the middle part, and when the other end of the press plate is fitted with the limiting structure, both ends of the press plate can not move up and down under the restrictions of the articulated part and the limiting structure, respectively.

2. The snap spring assembling device for disc spring according to claim 1, characterized in that the lifting drive mechanism is a cylinder arranged under the lifter, and the piston rod of the cylinder is connected with the lifter.

3. The snap spring assembling device for disc spring according to claim 1, characterized in that the lifting drive mechanism is of a gear-rack structure, the rack of the gear-rack structure is fixed to the lifter and is parallel to the axes of the positioning hole in the length direction, the gear of the gear-rack structure is meshed with the rack, and the gear is driven by a drive motor.

4. The snap spring assembling device for disc spring according to claim 1, characterized in that a drive motor is disposed on the bedplate, the lifter is directly or indirectly supported on a feed screw nut which is fitted with a screw rod, the screw rod is connected with a worm wheel via a shaft sleeve, the output shaft end of the drive motor is provided with a worm screw, and the worm screw is inserted into the

positioning seat and in a transmission fit with the worm wheel.

5. The snap spring assembling device for disc spring according to any preceding claim, characterized in that the press plate is arranged horizontally.

6. The snap spring assembling device for disc spring according to claim 5, characterized in that the other side of the upper end of the positioning seat opposing to the articulated part of the upper end to the press plate forms a first bulge which is higher than the articulated part of the upper end of the positioning hole to the press plate, the limiting structure is a cambered horizontal groove on the inner wall of the first bulge, and the cambered horizontal groove is fitted with the free end of the press plate.

7. The snap spring assembling device for disc spring according to claim 6, characterized in that the articulated part of the upper end of the positioning seat to the press plate forms a second bulge, the end part of the press plate is articulated with the upper end of the second bulge, and the upper end of the positioning seat is provided with a first notch and a second notch which are positioned between the first bulge and the second bulge in the circumferential direction.

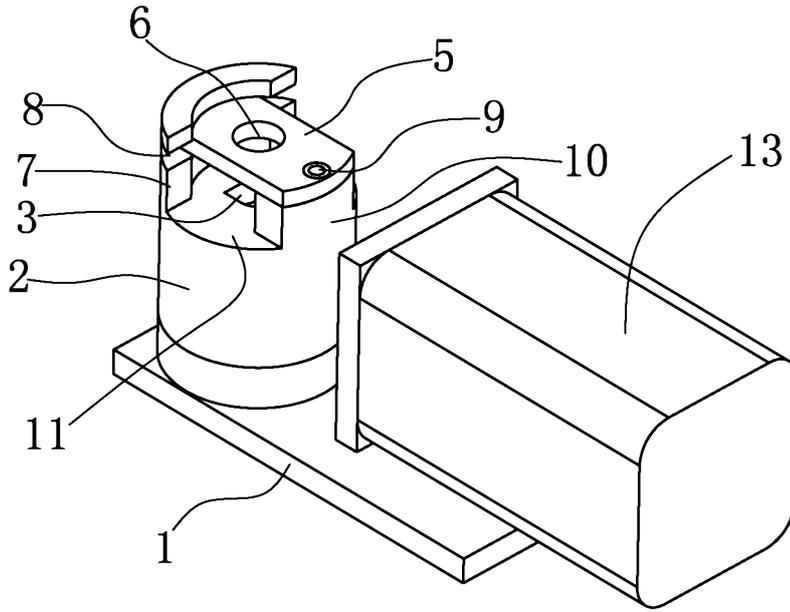


FIG. 1

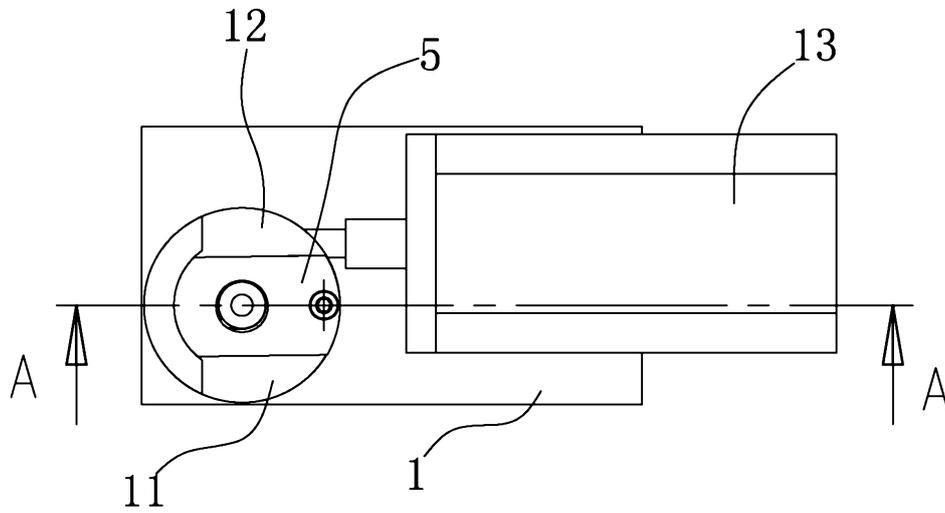


FIG. 2

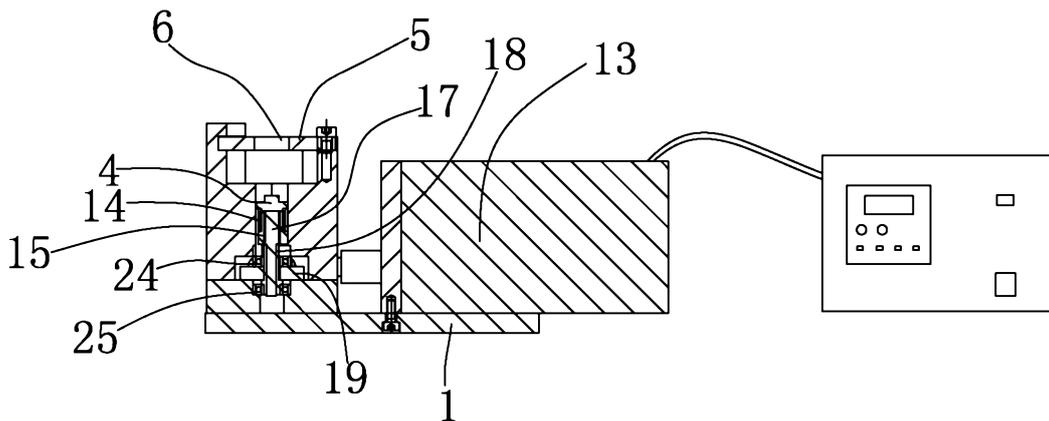


FIG. 3

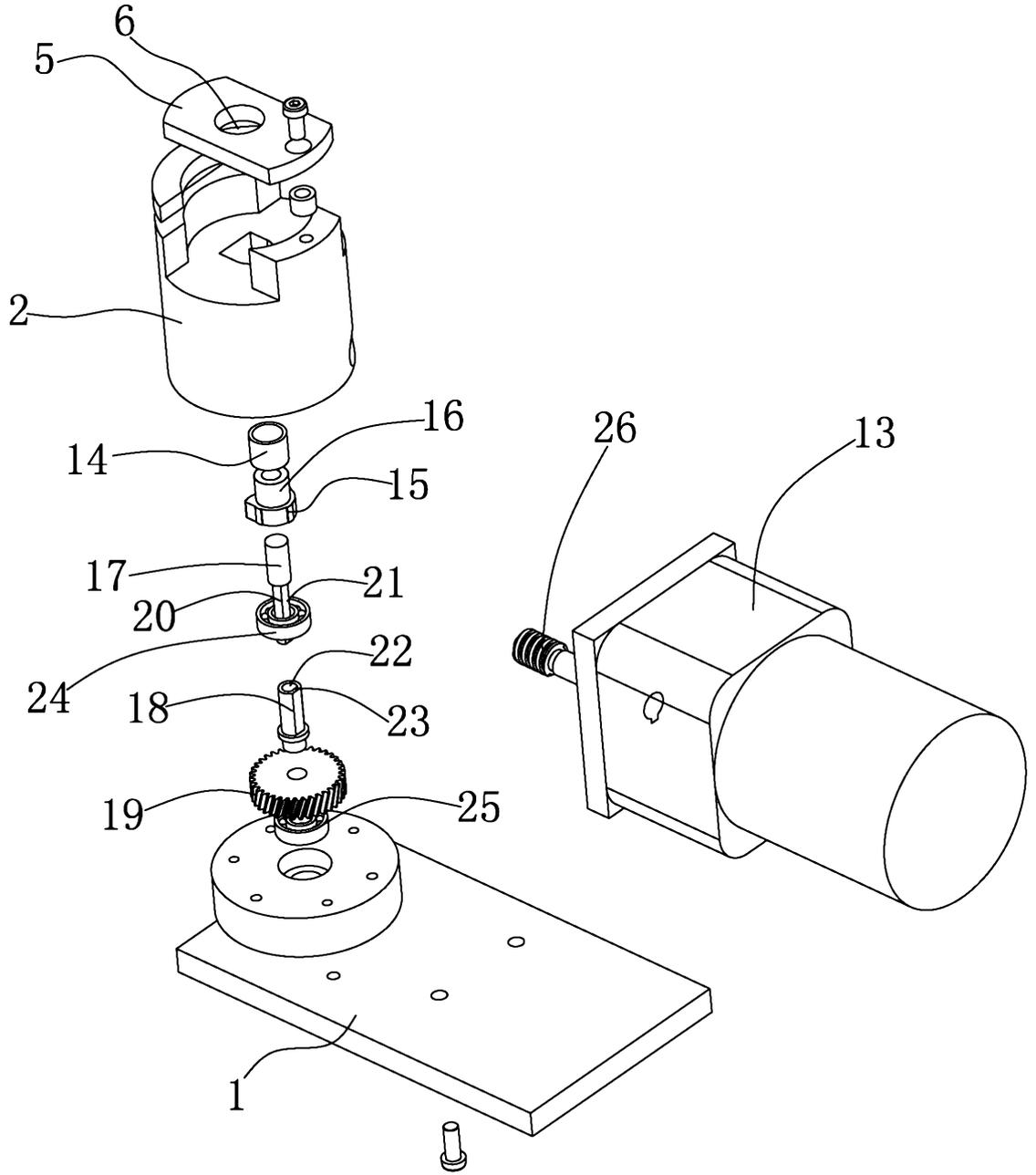


FIG. 4