FULL-AUTOMATIC POLISHING MACHINE

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ABSTRACT

The present invention belongs to the technical field of polishing machinery, and particularly relates to a full-automatic polishing machine aiming at the valve core head of a snort valve. The full-automatic polishing machine comprises a base, and a material taking device, a fixture and a polishing device which are provided on the base, wherein the material taking device comprises mechanical arms, and a first driving mechanism for driving the mechanical arms to move in transverse and vertical directions; and the polishing device comprises a grinding wheel, a second driving mechanism for driving the grinding wheel to rotate, and a third driving mechanism for driving the grinding wheel to move in longitudinal and vertical directions. By adopting the full-automatic polishing machine, automatic polishing of the valve core head of the snort valve is realized, plenty of manpower is saved, the working efficiency is improved, and a polished product is unified in quality, and thus being favorable for the large-scale production and export of the valve core heads.
FIG. 2
FULL-AUTOMATIC POLISHING MACHINE

TECHNICAL FIELD

[0001] The present invention belongs to the technical field of polishing machinery, and particularly relates to a full-automatic polishing machine aiming at the valve core head of a snort valve.

BACKGROUND

[0002] For many metal parts on the present market, surface polishing treatment is needed, and the valve core head of a snort valve is no exception. Because the shape of the valve core head of a snort valve is an arc curve, and is relatively small, manual polishing is mainly adopted here-upon on the present market. Manual polishing is not only low in speed, but also consumes plenty of manpower, meanwhile, there is a great requirement for the technology of polishing personnel, and the polished products are different in quality.

SUMMARY

[0003] Aiming at the problems mentioned above, the present invention provides a full-automatic polishing machine, which is capable of realizing full-automatic polishing on a workpiece, and improving the product quality and working efficiency.

[0004] The present invention provides a full-automatic polishing machine, and the full-automatic polishing machine comprises a base, and a material taking device, a fixture and a polishing device which are provided on the base, wherein the material taking device comprises a mechanical arm, and a first driving mechanism for driving the mechanical arm to move in transverse and vertical directions; and the polishing device comprises a grinding wheel, a second driving mechanism for driving the grinding wheel to rotate, and a third driving mechanism for driving the grinding wheel to move in longitudinal and vertical directions.

[0005] Further, the first driving mechanism comprises: a first mini cylinder which is provided on the base, a first flange plate which is connected with the piston rod of the first mini cylinder, a first compact type cylinder which is provided on the first flange plate, and a first connecting member which is connected with the piston rod of the first compact type cylinder; and

[0006] a slide rail is provided on the base, the first flange plate is provided on the slide rail and is in sliding fit with the base, the first mini cylinder drives the first flange plate to move transversely, the first compact type cylinder drives the first connecting member to move vertically, and the mechanical arm is connected with the first connecting member.

[0007] Further, the second driving mechanism comprises: a pneumatic motor, and a synchronizing wheel which is connected with a rotating shaft of the pneumatic motor; and the grinding wheel is coaxially connected with the synchronizing wheel.

[0008] Further, the third driving mechanism comprises: a second mini cylinder which is provided on the base, a second flange plate which is connected with the piston rod of the second mini cylinder, a second compact type cylinder which is provided on the second flange plate, and a second connecting member which is connected with the piston rod of the second compact type cylinder; and

[0009] a slide rail is provided on the base, the second flange plate is provided on the slide rail and is in sliding fit with the base, the second mini cylinder drives the second flange plate to move longitudinally, the second compact type cylinder drives the second connecting member to move vertically, and the pneumatic motor is fixed on the second connecting member.

[0010] Further, the fixture comprises: a spring chuck, a four driving mechanism for driving the spring chuck to rotate, and a fifth driving mechanism for driving the spring chuck to deform elastically.

[0011] Further, the spring chuck is slotted along a radial direction, and is provided with a step surface used for allowing a workpiece to be placed.

[0012] Further, a loading device is provided on the base, and the loading device is a vibrating plate.

[0013] Further, the base is provided with a loading tabletop, a discharge hole of the vibrating plate is provided on the loading tabletop, and the loading tabletop and the step surface of the spring chuck are located on the same horizontal plane and on a same straight line.

[0014] Further, the quantity of the mechanical arms is two, and the two mechanical arms are provided in parallel transversely, and are located on a same horizontal plane and on a same straight line.

[0015] Further, the mechanical arm is a finger cylinder.

[0016] Further, a sorting device is provided on the base, and comprises a tray, the scraping device is provided on the tray and a rotating cylinder for driving the scraping device to rotate.

[0017] By virtue of the scheme, the full-automatic polishing machine has the following advantages: the full-automatic polishing machine realizes automatic polishing of the valve core head of the snort valve, saves plenty of manpower and improves the working efficiency, and the polished products are unified in quality, and thus being favorable for the large-scale production and export of the valve core head; according to the present invention, a vibrating plate is adopted for automatic loading, and therefore, the production cycle is shortened, and the large-scale production efficiency is improved; a high-strength grinding wheel is adopted for automatic grinding, and therefore, manpower and material resources are reduced, the grinding quality is improved, and product use and export are facilitated; a finger cylinder is adopted for replacing manpower to clamp and convey materials; and therefore, simultaneous loading and unloading are realized; all parts of the polishing machine cooperate orderly, and thus being safe and rapid in the process, saving the production time, and improving the grinding quality; in grading, the spring chuck is adopted for clamping the valve core, and rotates at high speed relative to the grinding wheel, and therefore, the grading speed is promoted, polishing force is uniform, roughness requirement is met, and quality is improved; and after grading is completed, the materials are sorted by using a scraping device, so that the valve core heads are placed orderly, without manpower for sorting, and therefore, labor force is reduced, and cost is saved.

BRIEF DESCRIPTION OF FIGURES

[0018] FIG. 1 is a structure schematic diagram of an automatic polishing machine;

[0019] FIG. 2 is a local structure schematic diagram of the automatic polishing machine; and
FIG. 3 is a local structure schematic diagram of the automatic polishing machine.

DETAILED DESCRIPTION

The present invention provides a full-automatic polishing machine, which comprises a base 1, and a loading device, a material taking device, a fixture, a polishing device and a sorting device which are provided on the base 1. After the material taking device grabs a workpiece 33, the workpiece 33 is put into the fixture, then the polishing device polishes the workpieces 33, and after the polishing operation is completed, the material taking device grabs the workpieces 33 and puts the workpieces 33 into the sorting device, so the workpieces are arranged orderly.

The loading device is a vibrating plate 2, a loading tabletop 3 is provided on the base 1, a discharge hole of the vibrating plate 2 is provided on the loading tabletop 3, the workpieces 33 are automatically loaded to the loading tabletop 3 by the vibrating plate 2, and a sensor is provided on the loading tabletop 3, and is used for sensing whether a workpiece exists on the loading tabletop 3.

The material taking device comprises mechanical arms, and a first driving mechanism for driving the mechanical arms to move in the transverse and vertical directions. The first driving mechanism comprises a first mini cylinder 5 which is provided on the base 1, a first flange plate 6 which is connected with the piston rod of the first mini cylinder 5, a first compact type cylinder 7 which is provided on the first flange plate 6, and a first connecting member 8 which is connected with the piston rod of the first compact type cylinder 7. The first flange plate 6 is in sliding fit with the base 1, a slide rail 9 is provided on the base 1, the first flange plate 6 is provided on the slide rail 9, and the first mini cylinder 5 drives the first flange plate 6 to move transversely. The first compact type cylinder 7 drives the first connecting member 8 to move vertically. The mechanical arms are provided below the first connecting member 8, the mechanical arms are finger cylinders 4, the quantity is two, and the two mechanical arms are provided in parallel transversely, and are located on a same horizontal plane or on a same straight line.

The polishing device comprises a grinding wheel 10, a second driving mechanism for driving the grinding wheel 10 to rotate, and a third driving mechanism for driving the grinding wheel 10 to move in the longitudinal and vertical directions. The second driving mechanism comprises a pneumatic motor 11, and a synchronizing wheel 12 which is connected with a rotating shaft of the pneumatic motor 11; and the grinding wheel 10 is coaxially connected with the synchronizing wheel 12. The third driving mechanism comprises a second mini cylinder 13 which is provided on the base 1, a second flange plate 14 which is connected with the piston rod of the second mini cylinder 13, a second compact type cylinder 15 which is provided on the second flange plate 14, and a second connecting member 16 which is connected with the piston rod of the second compact type cylinder 15. The second flange plate 14 is in sliding fit with the base 1, a slide rail 9 is provided on the base 1, the second flange plate 14 is provided on the slide rail 9, the second mini cylinder 13 drives the second flange plate 14 to move longitudinally. The second compact type cylinder 15 drives the second connecting member 16 to move vertically. A groove is formed in the second connecting member 16, the pneumatic motor 11 is fixed on the second connecting member 16, the synchronizing wheel 12 is provided in the groove of the second connecting member 16 and is suspended, and the grinding wheel 10 is located below the second connecting member 16.

The fixture comprises a spring chuck 17, a fourth driving mechanism for driving the spring chuck 17 to rotate, and a fifth driving mechanism for driving the spring chuck 17 to deform elastically. The spring chuck 17 is slotted along a radial direction, and is provided with a step surface used for allowing a workpiece 33 to be placed, and the step surface on the spring chuck 17 and the loading tabletop 3 are located on a same horizontal plane and on a same straight line.

The spring chuck 17 is connected to a pull tube 18, the pull tube 18 is of a long cylinder shape, threads are formed at two ends of the pull tube 18, the spring chuck 17 is provided at the upper end of the pull tube 18, and an end cover 19 is provided at the lower end of the pull tube 18. A cylinder tube 20 is connected to the outer side of the pull tube 18, the upper end of the cylinder tube 20 expands outwards and forms a tapered hole, to be in match with the shape of the spring chuck 17, the lower end of the cylinder tube 20 is provided above the end cover 19. The cylinder tube 20 is fixed in a box 21 by a bearing, and the box 21 is fixed on the base 1. The fourth driving mechanism comprises a three-phase asynchronous motor 22 provided on the base 1, and a V belt wheel 24 which is connected with a motor shaft of the three-phase asynchronous motor 22 by a V-shaped belt 23, wherein the V belt wheel 24 is sleeved over the cylinder tube 20, and the spring chuck 17 is driven to rotate by the rotation of the three-phase asynchronous motor 22.

The fifth driving mechanism comprises a thin cylinder 25 provided on the base 1, a fisheye joint 26 which is connected with the piston rod of the thin cylinder 25, a beating ring 27 which is connected with the fisheye joint 26, a clutch lever 28 which is provided below the beating ring 27, and a clutch lever seat 29 which is connected with the clutch lever 28, wherein the beating ring 27 is sleeved over the cylinder tube 20 by a bearing, and the clutch lever seat 29 is sleeved over the cylinder tube 20 and is located above the end cover 19. The thin cylinder 25 pushes the beating ring 27, the beating ring 27 is pulled down to extrude the clutch lever 28, the clutch lever seat 29 slides down, the end cover 19 is pulled down to drive the pull tube 18 to slide down, the spring chuck 17 connected with the pull tube 18 slides down, and when the spring chuck 17 slides down, the tapered hole at the upper end of the cylinder tube 20 extrudes the spring chuck 17 to cause the spring chuck 17 to deform elastically to clamp the workpiece 33.

The sorting device comprises a tray 30 provided on the base 1, a scraping device 31 provided on the tray 30, and a rotating cylinder 32 for driving the scraping device 31 to rotate. The tray 30 is provided on one side of the spring chuck 17.
In addition, the base is also provided with a control cabinet 34 and a touch screen 35, wherein the touch screen 35 realizes inching control of instrument and equipment, and meanwhile displays counts and a running state.

In working, the finger cylinder 4 puts the workpieces 33 into the spring chuck 17, the spring chuck 17 clamps the workpieces 33, the grinding wheel 10 moves longitudinally to get close to the workpieces 33, and then moves down to align to the workpieces 33 to polish the workpieces 33, and while the grinding wheel 10 rotates, the workpieces 33 rotates at high speed relative to the grinding wheel by the driving of the fixture. After polishing is completed, the spring chuck 17 loosens clamping of the workpieces 33, and the finger cylinder 4 takes out the workpieces 33. Because the step surface on the spring chuck 17 and the loading tabletop 3 are located on a same horizontal plane and on a same straight line, the two finger cylinders 4 are capable of simultaneously grabbing the workpieces 33 on the loading tabletop 3 and the polished workpieces 33 on the spring chuck 17, then move upwards, and then move transversely to put the workpieces 33 on the loading tabletop 3 onto the spring chuck 17, and meanwhile, the workpieces 33 on the spring chuck 17 is put onto the tray 30, and the workpieces 33 on the tray 30 are sorted and arranged by the scrapping device 31. By repeating like this, full-automatic polishing of the workpieces 33 is realized.

Specifically, the whole operation process of the polishing machine is as follows: a start button is pressed, the vibrating plate 2 starts to vibrate, the workpieces 33 are conveyed to the loading tabletop 3 from the discharge hole by the vibration of the vibrating plate 2, the sensor on the loading tabletop 3 senses the workpieces 33 and feeds a signal back to the control cabinet 34, and after receiving the signal, a programmable logic controller in the control cabinet 34 triggers an output point, and sends a level signal to an intermediate relay, and the on and off of the intermediate relay controls the start and stop of the vibrating plate. At the moment, the vibrating plate 2 stops vibration, meanwhile, the material taking device at an initial position starts to act, the first compact type cylinder 7 descends, the two finger cylinders 4 which are transversely provided in parallel respectively grab the workpieces 33 on the loading tabletop 3 and the polished workpieces 33 on the spring chuck 17; after grabbing tightly, the first compact type cylinder 7 ascends, the vibrating plate 2 starts to act when the workpieces 33 are not on the loading tabletop 3; when the first compact type cylinder 7 ascends to an extreme position, the first mini cylinder 5 moves leftwards and stops after reaching the extreme position; the first compact type cylinder 7 descends, the two finger cylinders 4 loosen the workpieces 33, the workpieces are placed on the spring chuck 17 and on the tray 30; after loosening, the first compact type cylinder 7 ascends to reach an extreme position, the first mini cylinder 5 moves rightwards and stops after reaching an extreme position; in the moving process of the first mini cylinder 5, the scrapping device 31 sorts the workpieces placed in the unloading area, the spring chuck 17 clamps the workpieces, the three-phase asynchronous motor 22 drives the spring chuck 17 to rotate, and meanwhile, the polishing device starts to work, the pneumatic motor 11 starts to drive the grinding wheel 10 to rotate, and meanwhile, the polished workpieces 33, the second compact type cylinder 15 starts to ascend, when the second compact type cylinder 15 ascends to an extreme position, the second mini cylinder 13 retreats, and meanwhile, the pneumatic motor 11 and the spring chuck 17 stop rotation, the second mini cylinder 13 retreats to an extreme position, the second compact type cylinder 15 descends, at the moment, the material taking device starts to act at the initial position; by repeating like this, full-automatic polishing of the workpieces 33 is realized.

What is claimed is:
1. A full-automatic polishing machine, comprising a base, and a material taking device, a fixture and a polishing device which are provided on the base, wherein the material taking device comprises a mechanical arm, and a first driving mechanism for driving the mechanical arm to move in transverse and vertical directions; and the polishing device comprises a grinding wheel, a second driving mechanism for driving the grinding wheel to rotate, and a third driving mechanism for driving the grinding wheel to move in longitudinal and vertical directions.
2. The full-automatic polishing machine according to claim 1, wherein the first driving mechanism comprises: a first mini cylinder which is provided on the base, a first flange plate which is connected with the piston rod of the first mini cylinder, a first compact type cylinder which is provided on the first flange plate, and a first connecting member which is connected with the piston rod of the first compact type cylinder; and
wherein a slide rail is provided on the base, the first flange plate is provided on the slide rail and is in sliding fit with the base, the first mini cylinder drives the first flange plate to move transversely, the first compact type cylinder drives the first connecting member to move vertically, and the mechanical arm is connected with the first connecting member.
3. The full-automatic polishing machine according to claim 1, wherein the second driving mechanism comprises: a pneumatic motor, and a synchronizing wheel which is connected with a rotating shaft of the pneumatic motor; and the grinding wheel is coaxially connected with the synchronizing wheel.
4. The full-automatic polishing machine according to claim 3, wherein the third driving mechanism comprises: a second mini cylinder which is provided on the base, a second flange plate which is connected with the piston rod of the second mini cylinder, a second compact type cylinder which is provided on the second flange plate, and a second connecting member which is connected with the piston rod of the second compact type cylinder; and
wherein a slide rail is provided on the base, the second flange plate is provided on the slide rail and is in sliding fit with the base, the second mini cylinder drives the second flange plate to move longitudinally, the second compact type cylinder drives the second connecting member to move vertically, and the pneumatic motor is fixed on the second connecting member.
5. The full-automatic polishing machine according to claim 1, wherein the fixture comprises: a spring chuck, a fourth driving mechanism for driving the spring chuck to rotate, and a fifth driving mechanism for driving the spring chuck to deform elastically.
6. The full-automatic polishing machine according to claim 5, wherein the spring chuck is slotted in a radial direction, and is provided with a step surface used for allowing a workpiece to be placed.
7. The full-automatic polishing machine according to claim 6, wherein the base is provided with a loading tabletop, and the loading tabletop and the step surface are located on a same horizontal plane and on a same straight line.

8. The full-automatic polishing machine according to claim 7, wherein the quantity of the mechanical arms is two, and the two mechanical arms are provided in parallel transversely, and are located on a same horizontal plane and on a same straight line.

9. The full-automatic polishing machine according to claim 1, wherein a loading device is provided on the base, and the loading device is a vibrating plate.

10. The full-automatic polishing machine according to claim 1, wherein a sorting device is provided on the base, and comprises a tray, a scraping device provided on the tray and a rotating cylinder for driving the scraping device to rotate.