

Design and research of a conveying device for metal parts processing

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Abstract: The utility model relates to a conveying device for processing metal accessories with vibration type chip removal, which comprises an outer frame body, a conveying roller, a support plate, a conveying belt and a sprocket mechanism. The left and right sides of the bottom surface of the outer frame body are fixed with a fixed sleeve, and the internal screw of the fixed sleeve is installed with a second return spring, the top screw of the second return spring is fixed with a support rod, and the top screw of the support rod is fixed with an inner frame body, In addition, the left and right ends of the inner frame main body are internally connected with a conveying roller, the outer side of the conveying roller is fitted with a conveying belt, the inner wall of the upper surface of the conveying belt is fitted with a support plate, and the front and rear ends of the support plate are connected with the screws of the inner frame main body. The conveying device for processing metal parts with vibration type chip removal is provided with a cross bar and an eccentric wheel, so that the metal parts on the conveyor belt can be transported while vibrating, so that the debris and impurities on the surface of the metal parts can be well vibrated off.

Keywords: Vibration; Chip removal; Metal fittings; Conveyor

1. Introduction

Metal accessories refer to parts made of metal. Metal accessories need to be processed in such processes as chip cutting and grinding. In this process, conveying devices are required for conveying. Although there are many kinds of conveying devices on the market, there are still some shortcomings, such as:

The traditional conveying device only conveys the metal parts. After a series of processing, some debris and impurities will adhere to the surface of the metal parts. During the conveying process, the debris and impurities on the surface of the metal parts cannot be removed well, affecting the later processing process. At the same time, the conveying device has a single function and cannot be used well.

2. Technical Design Scheme

The utility model relates to a conveying device for processing metal accessories with vibration type chip removal, which comprises an outer frame body, a conveying roller, a support plate, a conveying belt and a sprocket mechanism. The left and right sides of the bottom surface of the outer frame body are fixed with a fixed sleeve, the internal screw of the fixed sleeve is installed with a second return spring, the top screw of the second return spring is fixed with a support rod, and the

top screw of the support rod is fixed with an inner frame body, The left and right ends of the inner frame main body are internally connected with a conveying roller, and the outer side of the conveying roller is fitted with a conveying belt, the inner wall of the upper surface of the conveying belt is fitted with a support plate, and the front and rear ends of the support plate are connected with the screws of the inner frame main body, and the upper surface of the conveying belt is fitted with a brush, the upper screw of the brush is installed with a connecting plate, and the rear side of the connecting plate is provided with a rack, And the upper part of the rack is meshed and connected with a half gear, the internal key of the half gear is connected with a fixed rod, and the rear end of the fixed rod is connected with the outer frame main body bearing, and the outer side of the rear end of the fixed rod is connected with the cross bar through a sprocket mechanism. The inner side wall of the rear side of the outer frame main body is provided with a groove, and the interior of the groove is provided with a fixed rod and a rack, and the front and rear ends of the cross bar are connected with the outer frame main body bearing, The rear end of the cross bar penetrates the outer frame body, the middle outer key of the cross bar is connected with an eccentric wheel, and the top end of the eccentric wheel fits with the bottom surface of the inner frame body. Preferably, the front side inner wall of the outer frame body is provided with a clamping groove, the rear side inner wall of the outer frame body is provided with a chute,

and the internal screw of the chute is fixed with a first return spring.

Preferably, the support rod is arranged in an inverted "t" shape structure, the support rod and the fixed sleeve are arranged in one-to-one correspondence, and the support rod forms a lifting structure with the fixed sleeve through the second return spring.

Preferably, the eccentric wheel is in intermittent contact with the inner frame body through the cross bar, and the inner frame body forms a lifting structure with the outer frame body through the eccentric wheel.

Preferably, the bottom screw of the rack is fixed with a sliding block, the lower outer side of the sliding block is connected with a sliding groove, and the left screw of the sliding block is fixed with a first return spring.

Preferably, the front-end screw of the connecting plate is fixed with a clamp block, the outside of the clamp block is clamped and sliding connected with a clamp slot, the rear-end screw of the connecting plate is fixed with a connecting block, and the rear end of the connecting block is connected with the rack through screws.

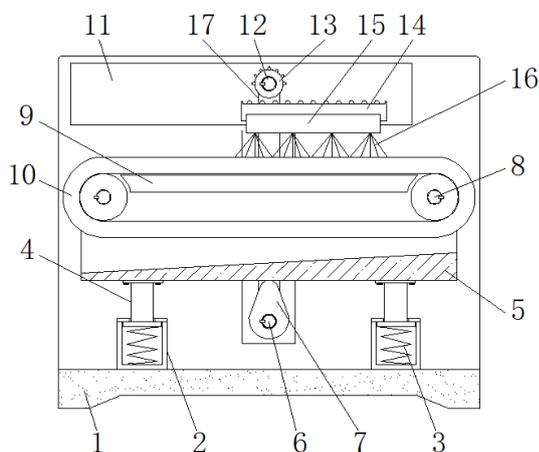


Fig. 1 Schematic diagram of main sectional structure of the device

1. Outer frame body; 101. Card slot; 102. Chute; 103. The first return spring; 2. Fixing sleeve; 3. A second return spring; 4. Support rod; 5. Inner frame body; 6. Cross bar; 7. Eccentric wheel; 8. Conveying roller; 9. Support plate; 10. Conveyor belt; 11. Grooves; 12. Fixed rod; 13. Half gear; 14. Rack; 141. Sliding block; 15. Connecting plate; 151. Clamping block; 152. Connecting block; 16. Brush; 17. Sprocket mechanism.

3. Example given to illustrate

The utility model relates to a conveying device for processing metal accessories with vibratory chip removal, which comprises an outer frame body 1, a clamping groove 101, a sliding groove 102, a first return spring 103, a fixed sleeve 2, a second return spring 3, a support rod 4, an inner frame body 5, a cross bar 6, an eccentric wheel 7, a conveying roller 8, a support plate 9, a conveying belt 10, a groove 11, a fixed rod 12, a half gear 13, a rack 14, a sliding block 141, a connecting plate 15, a clamping block 151, a connecting block 152, a brush 16 and a

sprocket mechanism 17, The left and right sides of the bottom surface of the outer frame main body 1 are fixed with a fixed sleeve 2 by screws, the internal screws of the fixed sleeve 2 are installed with a second return spring 3, the top screws of the second return spring 3 are fixed with a support rod 4, the top screws of the support rod 4 are fixed with an inner frame main body 5, the left and right ends of the inner frame main body 5 are connected with a conveying roller 8, and the outside of the conveying roller 8 is fitted with a conveying belt 10, The inner wall of the upper surface of the conveyor belt 10 is fitted with a support plate 9, and the front and rear ends of the support plate 9 are connected with the screws of the inner frame body 5, and the upper surface of the conveyor belt 10 is fitted with a brush 16, the upper screw of the brush 16 is installed with a connecting plate 15, and the rear side of the connecting plate 15 is provided with a rack 14, the upper part of the rack 14 is meshed with a half gear 13, and the internal key of the half gear 13 is connected with a fixed rod 12, The rear end of the fixed rod 12 is connected with the bearing of the outer frame main body 1, and the outside of the rear end of the fixed rod 12 is connected with the cross bar 6 through the sprocket mechanism 17. The inner side wall of the rear side of the outer frame main body 1 is provided with a groove 11, and the inside of the groove 11 is provided with a fixed rod 12 and a rack 14. The front and rear ends of the cross bar 6 are connected with the bearing of the outer frame main body 1, and the rear end of the cross bar 6 passes through the outer frame main body 1, and the middle outer key of the cross bar 6 is connected with an eccentric wheel 7, The top end of the eccentric wheel 7 fits with the bottom surface of the inner frame body 5;

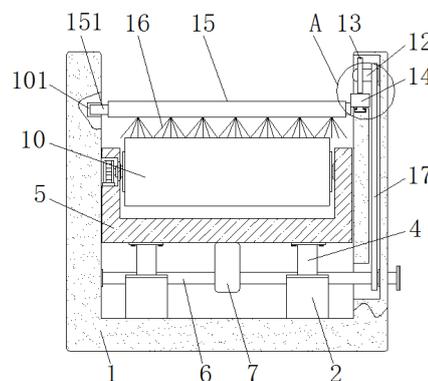


Fig. 2. Right view structure diagram

The inner wall of the front side of the outer frame main body 1 is provided with a clamping groove 101, and the inner wall of the rear side of the outer frame main body 1 is provided with a sliding groove 102, and the internal screw of the sliding groove 102 is fixed with a first return spring 103, so as to facilitate the clamping and sliding of the clamping block 151 through the clamping groove 101, so as to facilitate the stable movement of the connecting plate 15;

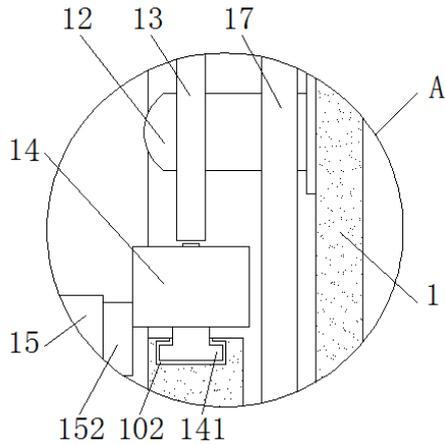


Fig. 3. Figure 2 enlarged structure diagram at a

The support rod 4 is arranged in an inverted "t" shape structure, and the support rod 4 is arranged in one-to-one correspondence with the fixed sleeve 2, and the support rod 4 forms a lifting structure with the fixed sleeve 2 through the second return spring 3. The support rod 4 is arranged in an inverted "t" shape structure, so that the support rod 4 can stably carry out lifting work in the fixed sleeve 2;

The eccentric wheel 7 is in intermittent contact with the inner frame main body 5 through the cross bar 6, and the inner frame main body 5 forms a lifting structure with the outer frame main body 1 through the eccentric wheel 7. The eccentric wheel 7 is in intermittent contact with the inner frame main body 5 through the cross bar 6, so as to facilitate the intermittent lifting of the inner frame main body 5;

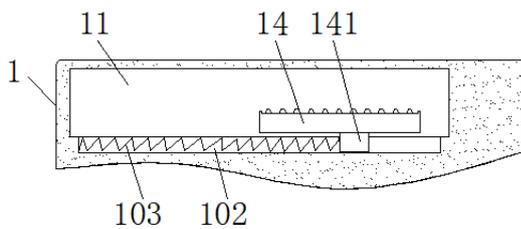


Fig. 4. Main sectional structure diagram of rack and outer frame main body connection

The bottom screw of the rack 14 is fixed with a sliding block 141, the lower outer side of the sliding block 141 is connected with a sliding groove 102, and the left screw of the sliding block 141 is fixed with a first return spring 103, which facilitates the stable movement of the rack 14 through the sliding of the sliding block 141 in the sliding groove 102;

The front-end screw of the connecting plate 15 is fixed with a clamp block 151, and the outside of the clamp block 151 is connected with a clamp slot 101 by clamping and sliding, and the rear-end screw of the connecting plate 15 is fixed with a connecting block 152. At the same time, the rear-end of the connecting block 152 is connected with

the rack 14 through screws, so that the connecting plate 15 can well drive the brush 16 to move back and forth.

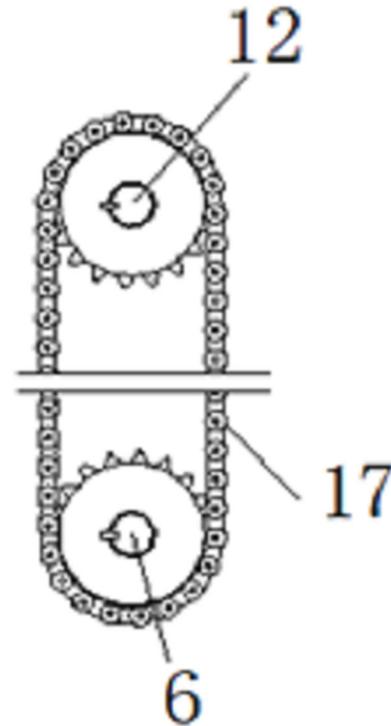


Fig. 5. Main view structure diagram of sprocket mechanism

4. Conclusion

Compared with the prior art, the innovation of a conveying device for metal parts processing with vibration chip removal is as follows:

(1) A cross bar and an eccentric wheel are arranged, and the rotation of the cross bar drives the eccentric wheel to rotate, so that the eccentric wheel drives the inner frame main body to rise and fall back and forth, and then the inner frame main body drives the inner conveyor belt to rise and fall back and forth, so that the metal accessories on the conveyor belt can be transported while vibrating, so that the debris and impurities on the surface of the metal accessories can be well shaken off;

(2) A fixed rod is installed. The rotation of the cross bar drives the fixed rod to rotate through the sprocket mechanism, so that the fixed rod drives the outer half gear to rotate, so that the half gear intermittently drives the rack to move. At the same time, with the use of the first return spring, the tooth strip drives the connecting plate and brush to move left and right, so as to facilitate the left and right pushing of the metal accessories on the conveyor belt, The utility model is convenient to brush away the debris and impurities on the surface of metal fittings, and improves the efficiency of removing debris.

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References

1. A galvanizing production process [p] Wangyi, Zhang Jian, Chengmin, tuxiaoqing, sunhuajun Chinese patent: cn111945091a, November 17, 2020
2. A workpiece surface grinding device with intermittent rotation for machining [p] Zhudongdong Chinese patent: cn211966953u, November 20, 2020
3. A fully automatic surface sandblasting device [p] Chenyuefu Chinese patent: cn111958499a, November 20, 2020
4. A method of coating zinc protective layer on workpiece surface [p] Chenzhiwei, Yu Jinzhang Chinese patent: cn111996483a, November 27, 2020
5. Deburring machine for workpiece surface treatment [p] Xuejiabin Chinese patent: cn212286994u, 2021-01-05
6. A surface leveling device for machining workpiece [p] Jiangtingdao Chinese patent: cn112192340a, 2021-01-08