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(54) **Grinding wheel and toothbrush grinding apparatus having the same**

(57) The present invention relates to a grinding wheel and a toothbrush grinding apparatus having the grinding wheel. Particularly, the present invention discloses a toothbrush grinding wheel comprising a cylindrical grinding barrel, and the main point of the technical solution is that, the toothbrush grinding wheel comprises a plurality of rows of grinding grains disposed on the outer periphery surface of the cylindrical grinding barrel. The present invention further discloses a toothbrush grinding apparatus comprising a stationary base, a swiveling bracket disposed on the stationary base, and a toothbrush grinding wheel disposed on the swiveling bracket. The toothbrush grinding wheel comprises a cylindrical grinding barrel, wherein a retainer for clamping a toothbrush is disposed on one side of the cylindrical grinding barrel, and there are a plurality of rows of grinding grains disposed on the outer periphery surface of the cylindrical grinding barrel. The present invention overcomes the disadvantages in prior arts, such as poor bristle grinding effects of the grinding wheel, easy occurrence of burrs, easy wearing out and high cost of the soft belt, so as to provide a low cost grinding wheel that is resistant to wear and does not need frequent replacement. Bristle grinding effect is greatly improved, the occurrence of burrs is reduced and the roundness of the bristle heads is increased.

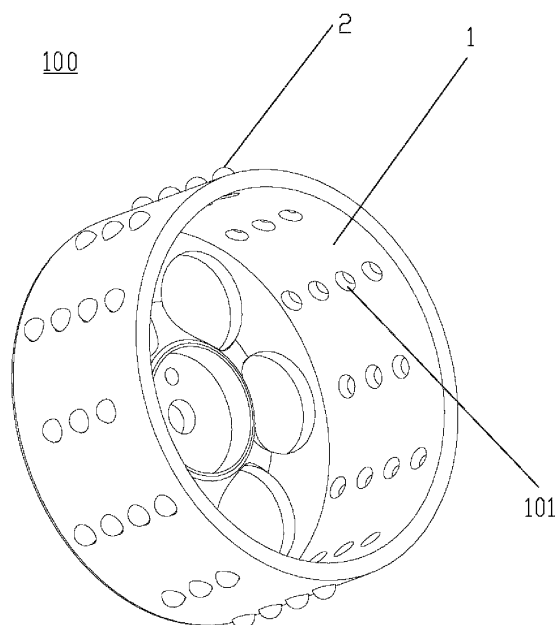


Fig. 1

Description

TECHNICAL FIELD

[0001] The present invention relates to a grinding wheel and a toothbrush grinding apparatus having the grinding wheel.

BACKGROUND

[0002] In toothbrush production, in order to protect gum and keep teeth healthy, the bristle heads of a toothbrush should be rounded. At present, an apparatus for rounding the bristle conducts the grinding by using a rotary grinding wheel. Fluffs/burrs easily occur on bristle heads grinded by ordinary methods, and lead to rejected products and inconsistency with national standards. The existing grinding wheel comprises a soft belt winding around a smooth grinding wheel. The soft belt has a high cost of production, and can easily be worn-out and damaged. It is also cumbersome to change the soft belt as the production needs to be stopped for the replacing, which will delay the production and incur additional cost of production indirectly. Replacing soft belt of a grinding wheel consumes time and expense, and increases cost of production. Moreover, the grinding wheel with soft belt has poor bristle grinding effects, and defects such as burrs may easily occur.

SUMMARY OF INVENTION

[0003] The aim of the present invention is to overcome the disadvantages in prior arts, such as poor bristle grinding effects of the grinding wheel, easy occurrence of burrs, easy wearing out and high cost of the soft belt, so as to provide a low cost grinding wheel that is resistant to wear and does not need frequent replacement. The present invention also provides a toothbrush grinding apparatus with the grinding wheel.

[0004] The aim of the present invention is implemented through following technical solutions:

[0005] A toothbrush grinding wheel, comprises a cylindrical grinding barrel and a plurality of rows of grinding grains disposed on the outer periphery surface of the cylindrical grinding barrel.

[0006] The toothbrush grinding wheel as described above, wherein the grinding grains comprise steel balls embedded on the outer periphery surface of the cylindrical grinding barrel.

[0007] The toothbrush grinding wheel as described above, wherein a plurality of apertures are disposed on the cylindrical surface of the cylindrical grinding barrel, and the steel balls are welded in the apertures.

[0008] The toothbrush grinding wheel as described above, wherein the grinding grains are arranged in alignment with the axial direction of the cylindrical grinding barrel, and are arranged alternately along the periphery of the cylindrical grinding barrel.

[0009] The toothbrush grinding wheel as described above, wherein the surface roughness of both the cylindrical grinding barrel and the grinding grain is about Ra380 microns.

5 [0010] A toothbrush grinding apparatus, comprises a stationary base, a swiveling bracket disposed on the stationary base and a toothbrush grinding wheel disposed on the swiveling bracket, wherein the toothbrush grinding wheel comprises a cylindrical grinding barrel, and a re-
10 tainer for clamping a toothbrush is disposed on a side of the cylindrical grinding barrel, and there are a plurality of rows of grinding grains disposed on the outer periphery surface of the cylindrical grinding barrel.

15 [0011] The toothbrush grinding apparatus as described above, wherein the grinding grains comprise steel balls embedded on the outer periphery surface of the cylindrical grinding barrel.

20 [0012] The toothbrush grinding apparatus as described above, wherein a plurality of apertures are disposed on the cylindrical surface of the cylindrical grinding barrel, and the steel balls are welded in the apertures.

25 [0013] The toothbrush grinding apparatus as described above, wherein the grinding grains are arranged in alignment with the axial direction of the cylindrical grinding barrel, and are arranged alternately along the periphery of the cylindrical grinding barrel.

30 [0014] The toothbrush grinding apparatus as described above, wherein the cylindrical grinding barrel swivels along with the swiveling bracket and rotates around the central axis of the cylindrical grinding barrel.

[0015] Compared to prior art, the present invention has the following advantages:

35 [0016] In the present invention, grinding grains are fixed directly on the grinding wheel, and especially steel balls are fixedly welded on the grinding wheel. This improves the bristle grinding effects and roundness of the ground bristle heads, and reduces the occurrence of the burrs. Additionally, the grinding wheel of the present invention is not easily worn out, so that the cost of production is reduced. The grinding wheel does not need frequent replacement, so as to facilitate the easygoing of the production, and the production will not be delayed due to replacement of grinding wheel.

45 BRIEF DESCRIPTION OF THE DRAWING FIGURES

[0017] For understanding the way to implement the embodiment of the present invention, various different embodiments of the present invention summarized above will be described more particularly by referring to the accompanying drawings. It should be understood that, these drawings only depict typical embodiments of the present invention. These embodiments may not be drawn to scale, and thus these are not limitations to the present invention. By using the drawings, the embodiments of the present invention will be described and explained with extra features and details, wherein:

[0018] Figure 1 is a perspective view of a toothbrush

grinding wheel of the present invention;

[0019] Figure 2 is a perspective view of a toothbrush grinding apparatus of the present invention;

[0020] Figure 3 is an exploded view of the toothbrush grinding apparatus of the present invention;

[0021] Figure 4 is a perspective view in another direction of the toothbrush grinding apparatus of the present invention;

[0022] Figure 5 is a perspective view of the toothbrush grinding apparatus of the present invention under working condition.

DETAILED EMBODIMENTS

[0023] In the following detailed description, the embodiments shown by the drawings will be referred to. These embodiments are described in sufficient details so as to enable those skilled in the art to put the present invention into effect. It should be understood that, in each disclosed embodiment, the location and arrangement of a single component can be modified without departing from the spirit and scope of the present invention. Therefore, the following detailed description should not be regarded as being limitative, and the scope of the present invention is defined only by the appended claims.

[0024] First referring to Figure 1, Figure 1 depicts a perspective view of a toothbrush grinding wheel of the present invention. Toothbrush grinding wheel 100 comprises a cylindrical grinding barrel 1 and a plurality of rows of grinding grains 2 disposed on the outer periphery surface of the cylindrical grinding barrel 1. In one preferred embodiment of the present invention, the grinding grains 2 may be steel balls embedded on the cylindrical grinding barrel 1. In one embodiment of the present invention, there are a plurality of apertures 101 disposed on the cylindrical surface of the cylindrical grinding barrel 1, and the steel balls are welded in the apertures 101. Because the grinding grains are fixed directly on the grinding wheel, especially the steel balls are fixedly welded on the grinding wheel, bristle grinding effects and roundness of the ground bristle heads are improved, and the occurrence of the burrs is reduced.

[0025] Then referring to Figures 2-5, Figures 2-5 depict a toothbrush grinding apparatus with the toothbrush grinding wheel in accordance with the present invention. The toothbrush grinding apparatus comprises a stationary base 3, a swiveling bracket 4 disposed on the stationary base 3 and a toothbrush grinding wheel 100 disposed on the swiveling bracket 4, wherein the toothbrush grinding wheel 100 comprises a cylindrical grinding barrel 1. There is a motor disposed on the swiveling bracket 4 which drives a larger belt pulley 6 to rotate. The larger belt pulley 6 drives a small belt pulley 7 to rotate, wherein the small belt pulley 7 is coaxial with the grinding barrel 1. Then, the grinding barrel 1 swivels along with the swiveling bracket 4 and may at the same time rotate around its central axis, in order to realize the grinding of the bristles of a toothbrush.

[0026] A retainer 5 for clamping a toothbrush is disposed on one side of the cylindrical grinding barrel 1. There are a plurality of rows of grinding grains 2 disposed on the outer periphery surface of the cylindrical grinding barrel 1. In one embodiment, the surface roughness of both the cylindrical grinding barrel 1 and the grinding grain 2 may be about Ra380 microns. In one preferred embodiment of the present invention, the grinding grains 2 may be steel balls embedded on the cylindrical grinding barrel 1. In one embodiment of the present invention, the grinding barrel 1 is a thin wall cylinder cover. There are a plurality of apertures 101 disposed on the cylindrical surface thereof, and the steel balls are welded in the apertures 101. The steel balls may be welded from inner side of the grinding barrel 1 so as not to affect the outer surface of the grinding barrel 1.

[0027] The grinding grains 2 may be arranged in alignment with the axial direction of the cylindrical grinding barrel 1, and may be arranged alternately along the periphery of the cylindrical grinding barrel 1, i.e. the grinding grains in every other column are arranged in alignment with the peripheral direction.

[0028] In the present invention, steel balls are fixedly welded directly on the grinding wheel. The grinding wheel does not need frequent replacement, so as to facilitate the easygoing of the production, and the production will not be delayed due to replacement of grinding wheel. Moreover, the bristle heads of a toothbrush ground are roundish and smooth without fluffs/burrs, so as to meet the industry standard requirements.

[0029] Although the present invention is described with limited number of embodiments, those skilled in the art can realize many modifications and variations therefrom. The appended claims should be considered as covering all these modifications and variations falling within the spirit and scope of the present invention.

Claims

1. A toothbrush grinding wheel, comprising a cylindrical grinding barrel (1), **characterized in that**, the toothbrush grinding wheel comprises a plurality of rows of grinding grains (2) disposed on the outer periphery surface of the cylindrical grinding barrel (1).
2. The toothbrush grinding wheel of claim 1, **characterized in that**, the grinding grains (2) comprise steel balls embedded on the outer periphery surface of the cylindrical grinding barrel (1).
3. The toothbrush grinding wheel of claim 2, **characterized in that**, there are a plurality of apertures (101) disposed on the cylindrical surface of the cylindrical grinding barrel (1), and the steel balls are welded in the apertures (101).
4. The toothbrush grinding wheel of any preceding

claim, **characterized in that**, the grinding grains (2) are arranged in alignment with the axial direction of the cylindrical grinding barrel (1), and are arranged alternately along the periphery of the cylindrical grinding barrel (1).

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5. The toothbrush grinding wheel of any preceding claim, **characterized in that**, the surface roughness of both the cylindrical grinding barrel (1) and the grinding grain (2) is about Ra380 microns.

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6. A toothbrush grinding apparatus, comprising:

a stationary base (3);

a swiveling bracket (4) disposed on the stationary base (3); and

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a toothbrush grinding wheel disposed on the swiveling bracket (4), the toothbrush grinding wheel comprising a cylindrical grinding barrel (1), wherein a retainer (5) for clamping a toothbrush is disposed on a side of the cylindrical grinding barrel (1), **characterized in that**, the toothbrush grinding wheel comprises a plurality of rows of grinding grains (2) disposed on the outer periphery surface of the cylindrical grinding barrel (1).

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7. The toothbrush grinding apparatus of claim 6, **characterized in that**, the grinding grains (2) comprise steel balls embedded on the outer periphery surface of the cylindrical grinding barrel (1).

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8. The toothbrush grinding apparatus of claim 6 or claim 7, **characterized in that**, there are a plurality of apertures (101) disposed on the cylindrical surface of the cylindrical grinding barrel (1), and the steel balls are welded in the apertures (101).

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9. The toothbrush grinding apparatus of any of claims 6 to 8, **characterized in that**, the grinding grains (2) are arranged in alignment with the axial direction of the cylindrical grinding barrel (1), and are arranged alternately along the periphery of the cylindrical grinding barrel (1).

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10. The toothbrush grinding apparatus of any one of claims 6 to 9, **characterized in that**, the cylindrical grinding barrel (1) swivels along with the swiveling bracket (4) and rotates around the central axis of the cylindrical grinding barrel (1).

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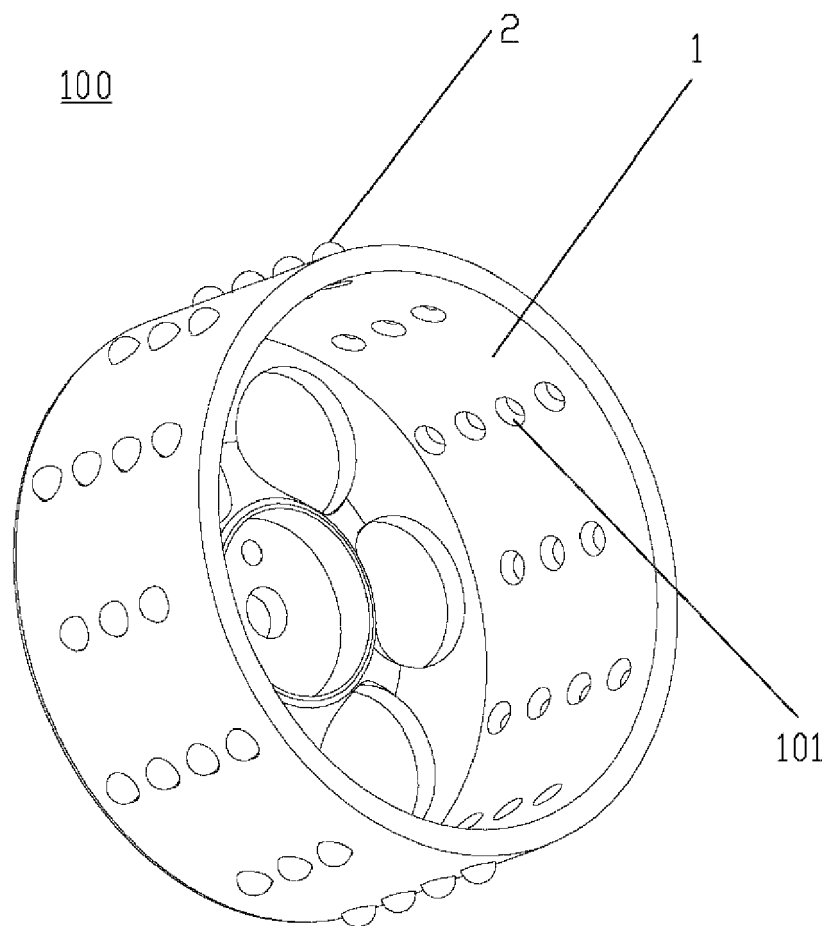


Fig. 1

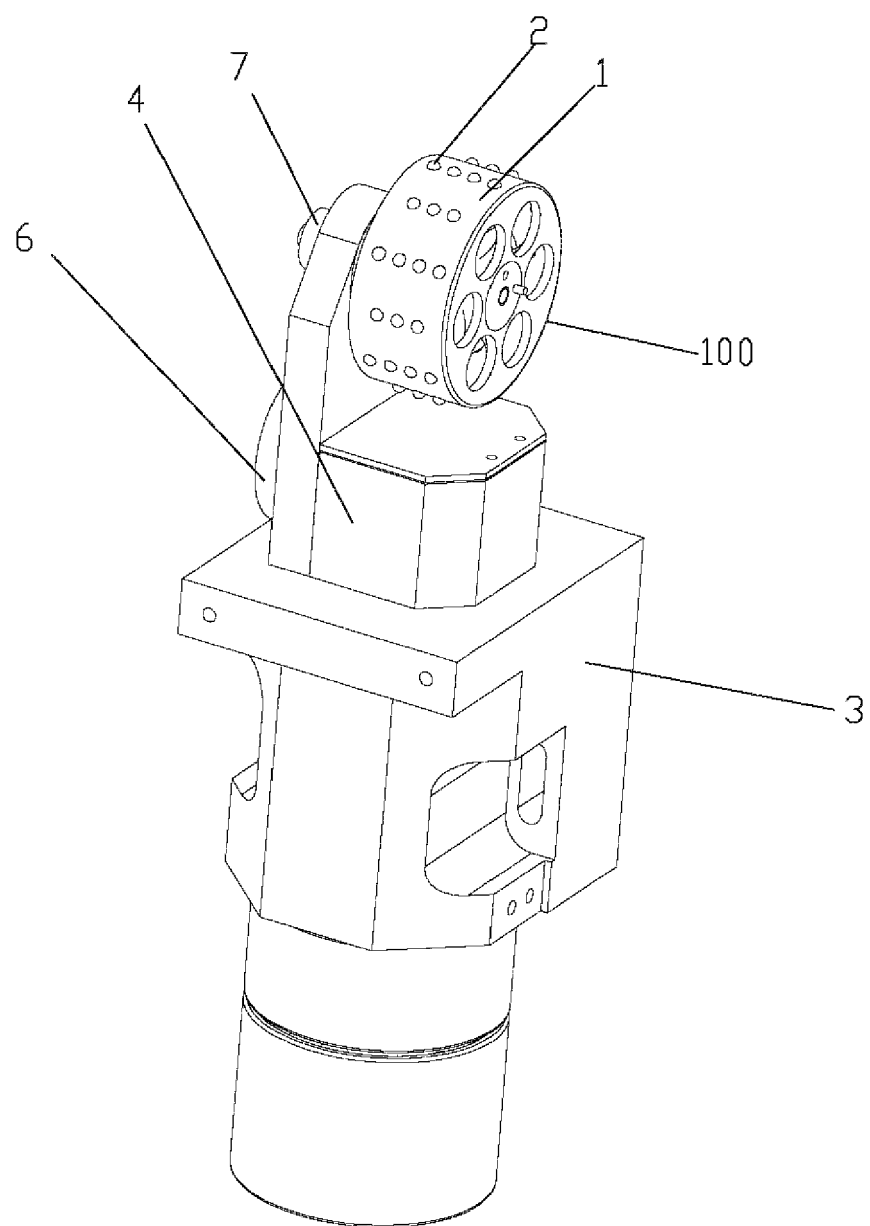


Fig. 2

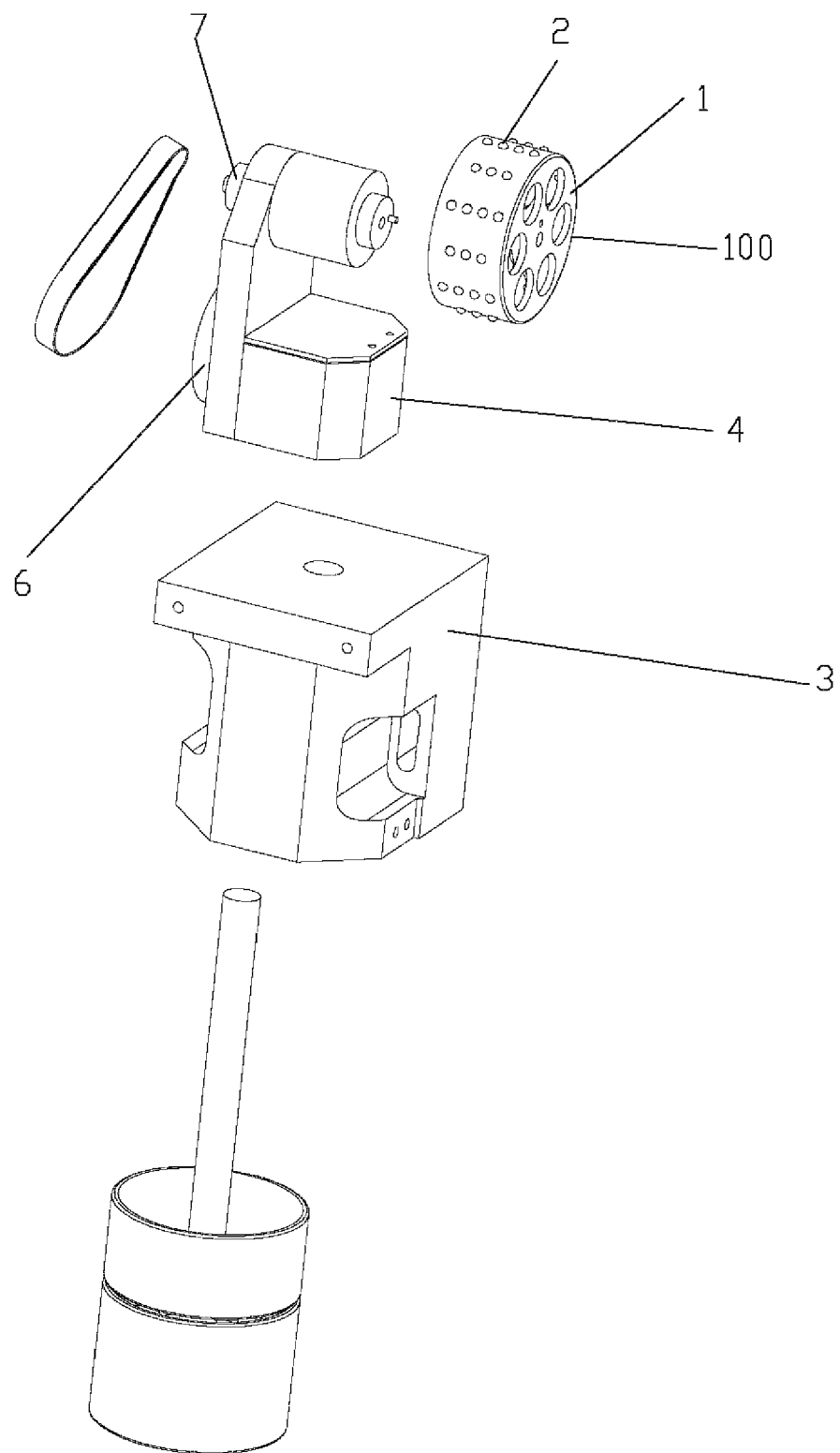


Fig. 3

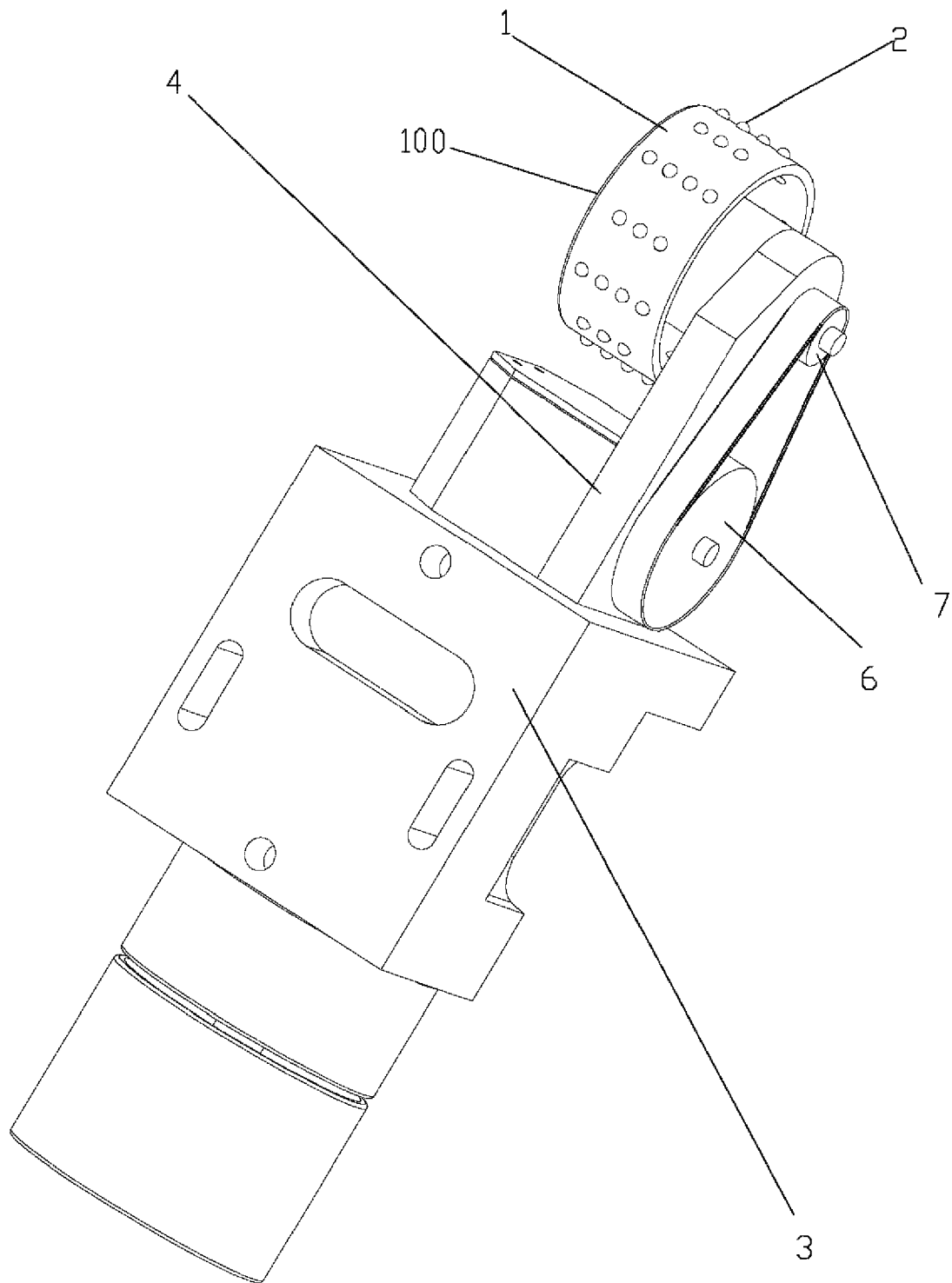


Fig. 4

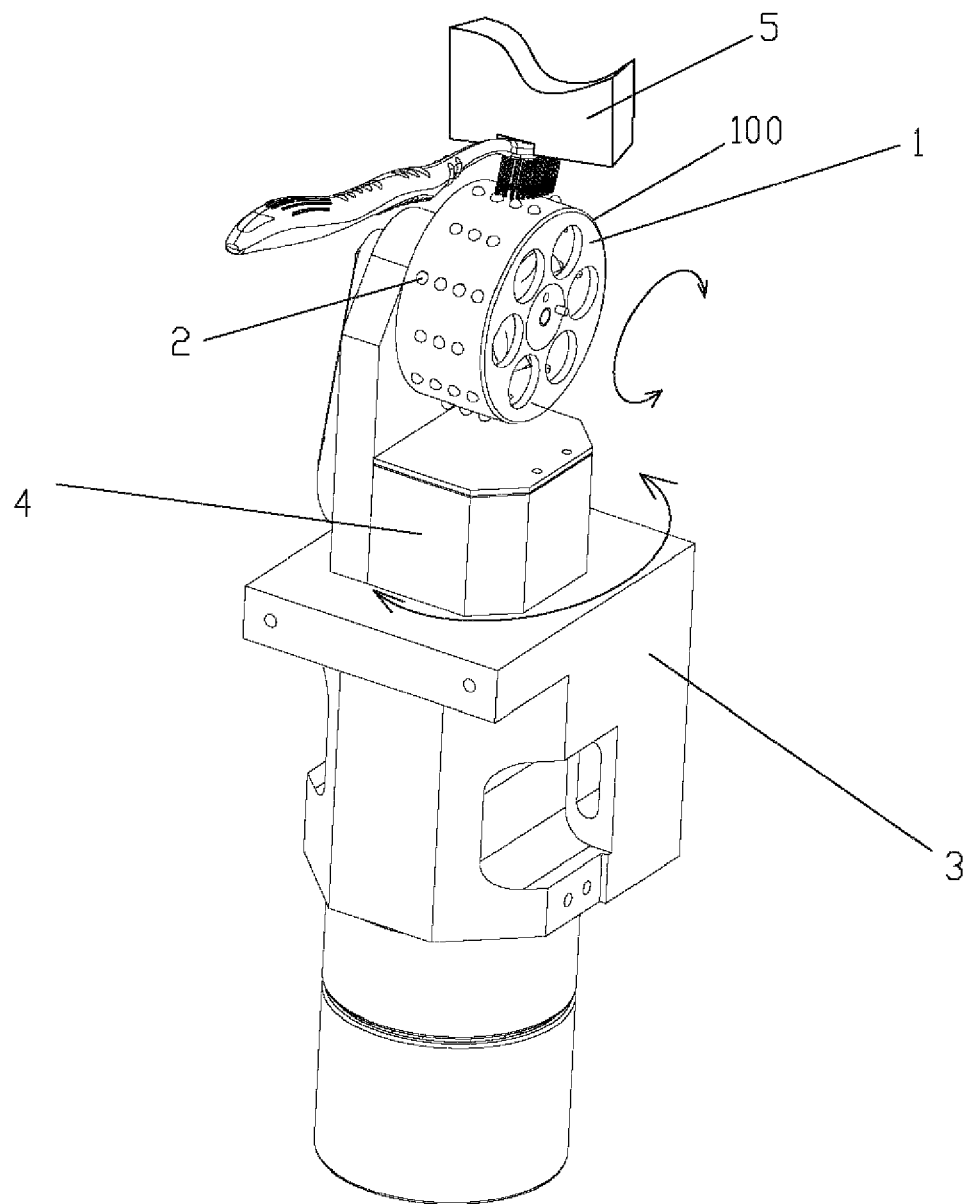


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 10 16 3216

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2008/315669 A1 (KWON YOUNG-JUN [KR] ET AL) 25 December 2008 (2008-12-25) * paragraphs [0030], [0032]; figures 2,4 *	1,5,6,10	INV. A46D9/02 B24D5/06
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 25 August 2010	Examiner Roche, Olivier
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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