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(54) **ROOTS ROTOR FOR REMOVING DUST COAGULUM AND DROPLETS**

(57) A roots rotor for removing dust coagulum and droplets comprises a rotor body, which rotates inside the roots pump case. Both ends of the rotor body are sealing surfaces, which are meshed with the inner wall of the roots pump case. The rotor slot scraping cavities are arranged on both sides of the sealing surface. The side of the rotor slot scraping cavity close to the sealing surface is set as the scraper surface, which forms a sharp edge with the sealing surface. A guide surface is arranged on the surface of the rotor body, and the guide surface is

located on the side of the rotor slot scraping cavity away from the sealing surface. The utility model overcomes the disadvantages of the prior art, and the attachment can be scraped off and gathered into the rotor slot scraping groove through the action of the scraper surface; and with the rotation of the rotor body, the particles and dust can be easily dropped outside the exhaust port of the pump; thus to achieve to avoid the accumulation of dust, coagulum and other incompressible medium in the process gas on the wall of the pump case.

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Description

Technical field

[0001] The utility model relates to the technical field of roots rotor, particularly to a roots rotor for removing dust coagulum and droplets.

Background art

[0002] Roots refers to a positive displace rotary pump installed two blade-shaped rotors synchronously rotating in opposite directions within the pump, with a small non-contacting clearance between the rotors, and between the rotor and the inner wall of the pump case. The molded lines of the blade-shaped rotor of the roots pump are mainly based on the involute or cycloid. The excircle of the rotor is a continuous arc, which is tangentially meshed with the wall of the pump case during rotation.

[0003] Thus, when the dust, coagulum, droplets and other incompressible particles remaining on the wall of the pump case contact with the roots rotor, it is just like a tire rolling over the ground with dust accumulation and the originally loose dust is crushed, which becomes denser and more firmly attached to the case wall. Therefore, when the roots pump is pumping the medium with dust, mediums easy for solidification and with water vapor, generally, when it's restarted after stopping, the clearance between the case wall and the rotor will be filled with solid attachments, and the resistance is too large, resulting in locking, unable to run. During dismantling and cleaning, it is found that the attachments are very hard and smooth, because the linearity of the roots rotor is a continuous arc, formed by tangent meshing.

[0004] And with the development of science and technology, more and more processes that require vacuum, and the process gas mediums that need to be treated are more and more complex, often encountering a large amount of dust, coagulum, incompressible medium, such as metallurgical refined steel, pharmaceutical, chemical, semiconductor, polycrystalline silicon, etc. Therefore, the existing conventional roots rotor needs to be modified to meet modern industrial needs.

Summary of utility model

[0005] In view of the disadvantages of the prior art, the utility model provides a rotor for removing dust coagulum and droplets, which overcomes the disadvantages of the prior art with reasonable design. The attachment can be scraped off and gathered into the rotor slot scraping groove through the action of the scraper surface; and with the rotation of the rotor body, the particles and dust can be easily dropped outside the exhaust port of the pump; thus to achieve to avoid the accumulation of dust, coagulum and other incompressible medium in the process gas on the wall of the pump case.

[0006] In order to achieve the above objectives, the

utility model is achieved through the following technical solutions:

[0007] A roots rotor for removing dust coagulum and droplets comprises a rotor body, which rotates inside the roots pump case. Both ends of the rotor body are sealing surfaces, which are meshed with the inner wall of the roots pump case. The rotor slot scraping cavities are arranged on both sides of the sealing surface. The side of the rotor slot scraping cavity close to the sealing surface is set as the scraper surface, which forms a sharp edge with the sealing surface. A guide surface is arranged on the surface of the rotor body, and the guide surface is located on the side of the rotor slot scraping cavity away from the sealing surface.

[0008] Preferably, the bottom of the scraper surface (5) and that of the rotor slot scraping cavity (4) are circular arc transitions.

[0009] Preferably, the inner surface of the rotor slot scraping cavity is a parabola structure.

[0010] Preferably, the guide surfaces of the surfaces of two matched rotor bodies are meshed.

[0011] The utility model provides a roots rotor for removing dust coagulum and droplets. It has the following beneficial effects: when the attachments on the inner wall of the roots pump case contact with the scraper surface on the side of the rotor slot scraping cavity, due to the clearance reserved between the position of the scraper surface contacting with the attachments and the inner wall of roots pump case is very small, the attachment can be scraped off and gathered into the rotor slot scraping cavity under the action of the scraper surface; and with the rotation of the rotor body, the original attachments in the rotor slot scraping cavity will be thrown out by centrifugal action, dropping into the groove of two rotor body surfaces meshed, and with the rotation, the particles and dust will be very easy to drop outside the exhaust port of the pump; thus to achieve to avoid the accumulation of dust, coagulum and other incompressible medium in the process gas on the wall of the pump case.

Description of drawings

[0012] In order to explain the technical solutions in the utility model or in the prior art more clearly, the brief introduction of drawings required in the description of the prior art is as follows.

FIG. 1 is a structure diagram of the utility model;

FIG. 2 is a structure diagram of the utility model when in use;

FIG. 3 is a plan view of the utility model;

FIG. 4 is a partial enlarged drawing at position of A in FIG. 3;

Description of numbers in the drawings:

[0013] 1. Rotor body; 2. Roots pump case; 3. Sealing surface; 4. Rotor slot scraping cavity; 5. Scraper surface;

6. Guide surface; 7. Attachment.

Embodiments

[0014] In order to make the objectives, technical solutions and advantages of the utility model clearer, the technical solutions in the utility model will be described clearly and completely combined with the drawings in the utility model.

[0015] As shown in FIG. 2, a roots rotor for removing dust coagulum and droplets comprises a rotor body 1, which rotates inside the roots pump case 2. Both ends of the rotor body 1 are sealing surfaces, which are meshed with the inner wall of the roots pump case 2. The rotor slot scraping cavities 4 are arranged on both sides of the sealing surface 3. The side of the rotor slot scraping cavity 4 close to the sealing surface 3 is set as the scraper surface 5, which forms a sharp edge with the sealing surface 3. A guide surface 6 is arranged on the surface of the rotor body 1, and the guide surface 6 is located on the side of the rotor slot scraping cavity 4 away from the sealing surface 3.

[0016] During implementation, a pair of rotor bodies 1 are placed in the cavity of roots pump case 2, and the roots rotor body 1 uses synchronous and counter rotating; when the rotor body 1 rotates and encounters liquid, dust and incompressible mediums on the inner wall of the roots pump case 2, firstly, the guide surface 6 of the rotor body 1 contacts with the inner wall of the roots pump case 2. Because the clearance between the guide surface 6 of the rotor body 1 and the inner wall of the roots pump case 2 is very big, and it is gradually approached tangentially, when the attachment 7 on the inner wall of the roots pump case 2 gets close to the rotor slot scraping cavity 4, a very big clearance is reserved between the rotor slot scraping cavity 4 and the inner wall of the roots pump case 2; therefore, when the attachment 7 is in the rotor slot scraping cavity 4, it contacts with the scraper surface 5 on the side of the rotor slot scraping cavity 4. Moreover, because the scraper surface 5 is close to the sealing surface 3 of the rotor body 1, the clearance between the position of the scraper surface 5 contacting with the attachment 7 and the inner wall of the Roots pump case 2 is very small, so that the attachment 7 can be scraped off and gathered to the rotor slot scraping cavity 4; with the rotation of the rotor body 1, the scraper surface 5 leaves the area of the inner wall of the roots pump case 2, the original particles or dust in the rotor slot scraping cavity 4 will be thrown out under centrifugal action, dropping into the groove of two rotor body surfaces meshed, and with the rotation, the particles and dust will be very easy to drop outside the exhaust port of the pump; thus to achieve to avoid the accumulation of dust, coagulum and other incompressible medium in the process gas on the wall of the pump case; the guide surface 6 is the involute or cycloid of the rotor body 1, and the guide surfaces 6 on the surfaces of two matched rotor bodies 1 are meshed.

[0017] Further, the bottom of the scraper surface 5 and that of the rotor slot scraping cavity 4 are circular arc transitions. The scraper surface 5 is a straight surface, and the bottom of the rotor slot scraping cavity 4 is a plane, so that the angle between the scraper surface 5 and the bottom surface of the rotor slot scraping cavity 4 is 80° - 88° ; thus, it allows the scraper surface 5 to shovel and separate the attached dust, particles and incompressible mediums better; at the same time, through the arc transitions of the bottoms of the scraper surface 5 and rotor slot scraping cavity 4, the shoveled and separated attachments from remaining in the clearance between scraper surface 5 and the rotor slot scraping cavity 4.

[0018] Further, the inner surface of the rotor slot scraping cavity 4 is a parabola structure. The particles, dust or other attachments scraped off by the scraper surface 5 are gathered in the rotor slot scraping cavity 4 in a loose structure, and when the rotor body 1 rotates again, the particles and dust, etc. gathered in the rotor slot scraping cavity 4 can be smoothly thrown out along the parabola structure in the rotor slot scraping cavity 4 under centrifugal action.

[0019] The above embodiments are only used to explain the technical solution of the invention, but not to limit it; although referring to the aforesaid embodiments, the invention has been described in detail, those skilled in the art shall understand that the technical solutions described in the aforesaid embodiments can still be modified, or some of the technical features are equivalently replaced; and these modifications or replacements shall not make the essence of the corresponding technical solutions deviate from the spirit and scope of the technical solutions of the embodiments of the invention.

Claims

1. A roots rotor for removing dust coagulum and droplets comprising a rotor body (1), which rotates inside the roots pump case (2), is **characterized in that**: both ends of the rotor body (1) are sealing surfaces (3), which are meshed with the inner wall of the roots pump case (2). The rotor slot scraping cavities (4) are arranged on both sides of the sealing surface (3). The side of the rotor slot scraping cavity (4) close to the sealing surface (3) is set as the scraper surface, which forms a sharp edge with the sealing surface (3). A guide surface (6) is arranged on the surface of the rotor body (1), and the guide surface (6) is located on the side of the rotor slot scraping cavity (4) away from the sealing surface (3).
2. The roots rotor for removing dust coagulum and droplets of claim 1, is **characterized in that**: the bottom of the scraper surface (5) and that of the rotor slot scraping cavity (4) are circular arc transitions.

3. The roots rotor for removing dust coagulum and droplets of claim 1, is **characterized in that**: the inner surface of the rotor slot scraping cavity (4) is a parabola structure.

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4. The roots rotor for removing dust coagulum and droplets of claim 1, is **characterized in that**: the guide surfaces (6) of the surfaces of two matched rotor bodies (1) are meshed.

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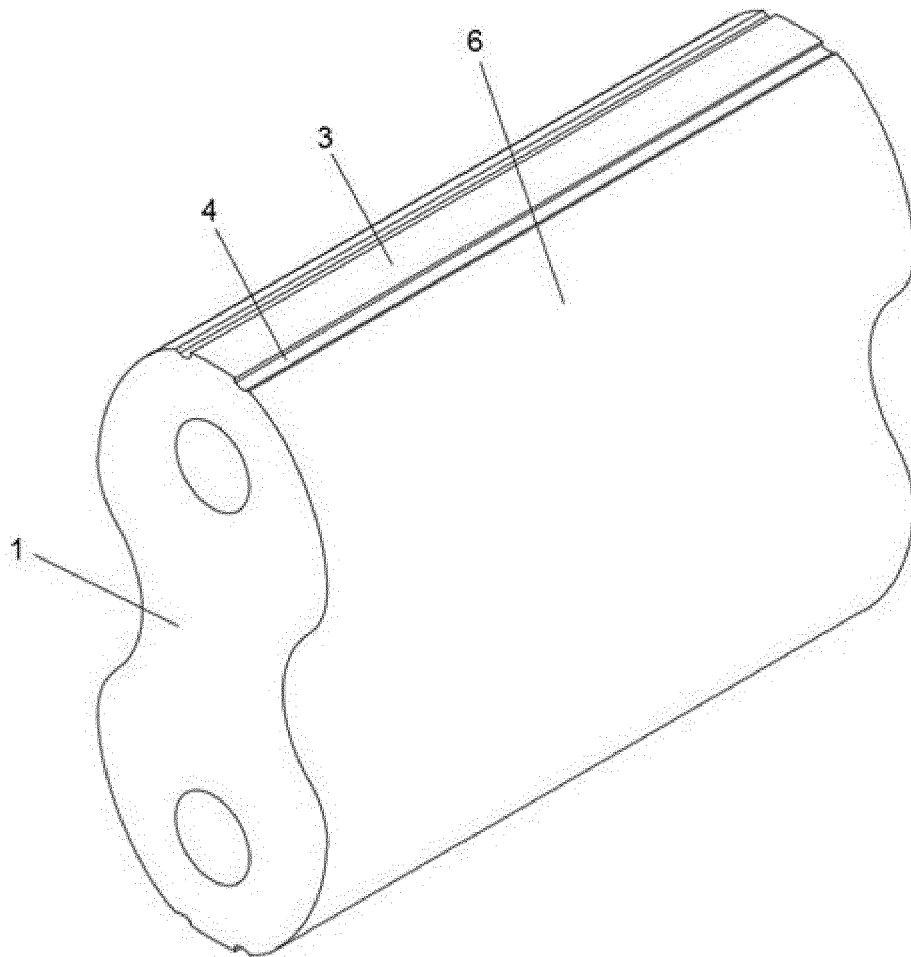


FIG. 1

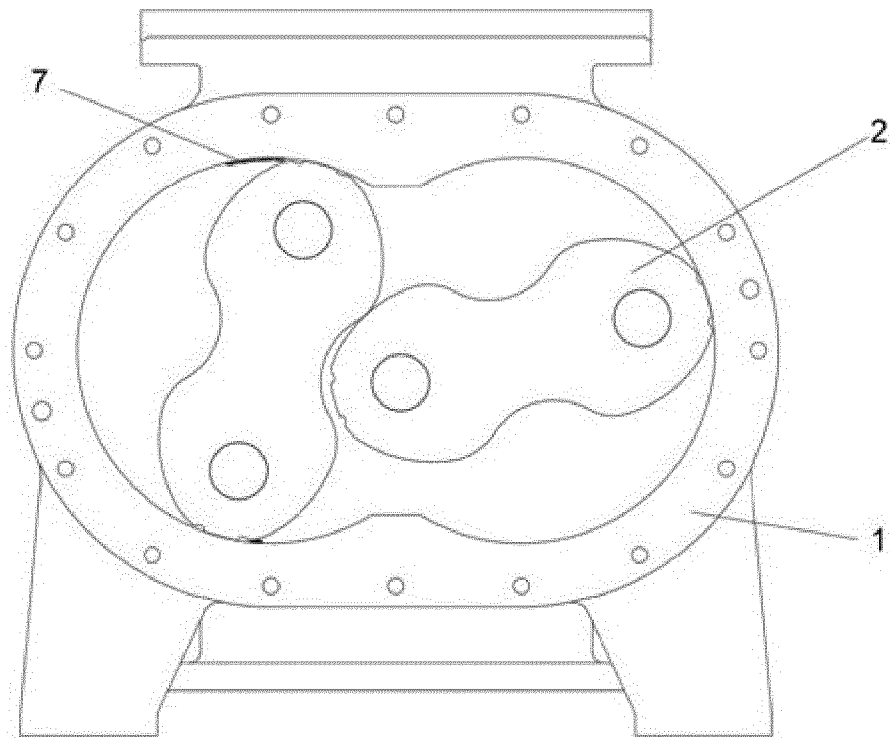


FIG. 2

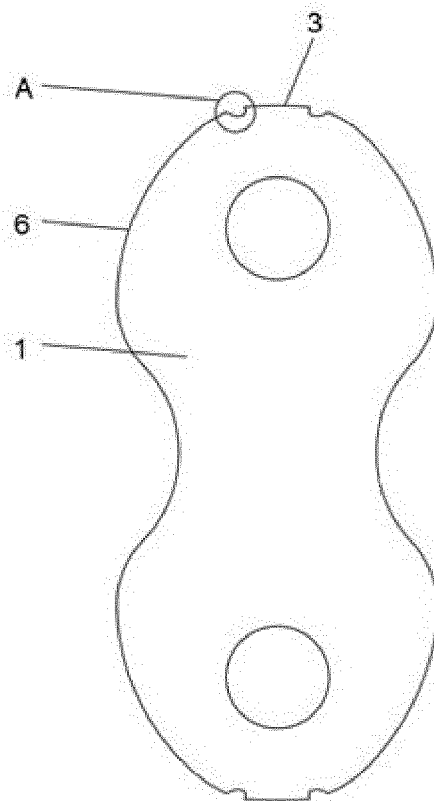


FIG. 3

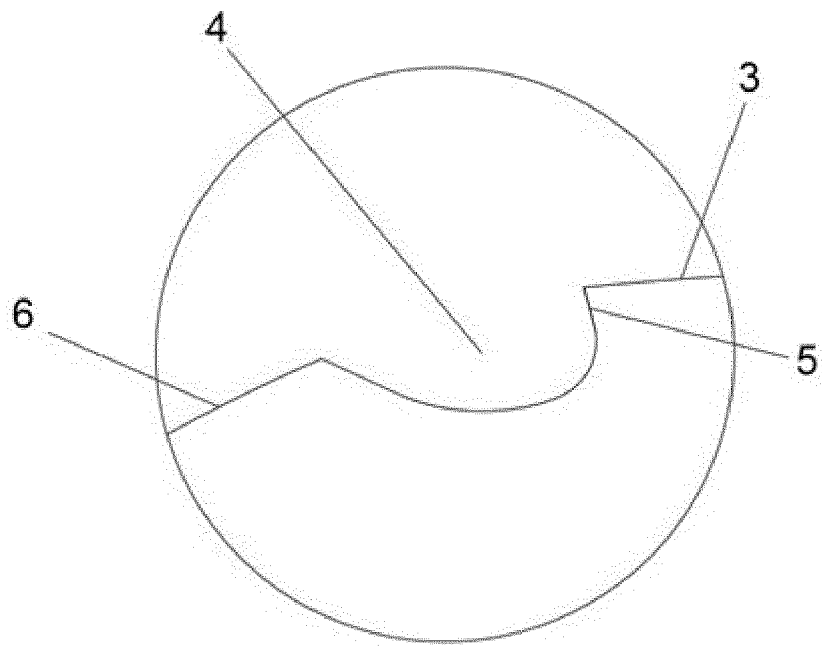


FIG. 4



EUROPEAN SEARCH REPORT

 Application Number
 EP 20 19 8674

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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 6 November 2020	Examiner Durante, Andrea
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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EP 20 19 8674

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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06-11-2020

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