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- **YANG, Yuejin**
Beijing 101149 (CN)
- **CHEN, Hao**
Beijing 101149 (CN)
- **WANG, Huming**
Beijing 101149 (CN)
- **LIU, Chunyang**
Beijing 101149 (CN)
- **WANG, Yajuan**
Beijing 101149 (CN)
- **LEI, Ting**
Beijing 101149 (CN)
- **HE, Liang**
Beijing 101149 (CN)
- **ZHANG, Chenguang**
Beijing 101149 (CN)

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(71) Applicant: **Beijing Environmental Engineering Technology Co., Ltd.**
Zhongguancun Science Park Opto-Mechatronics Industrial Park, Tongzhou District
Beijing 101149 (CN)

(72) Inventors:

- **NIE, Wenyuan**
Beijing 101149 (CN)
- **ZHAO, Ke**
Beijing 101149 (CN)

(74) Representative: **Kayahan, Senem**
Yalciner Patent and Consulting Ltd.
Tunus Cad. No: 85/3-4
Kavaklidere Cankaya
06680 Ankara (TR)

(54) **EXTRUSION SEPARATION AND PURIFICATION DEVICE**

(57) An extrusion separation and purification device, comprising an extrusion separation device body (100) and a purification device (200). The purification device comprises a material trough (7), a screw shaft (8), a motor (9), and a reduction box (10). An inner part of the material trough along the length direction of the material trough is provided with a sieve plate (16), the sieve plate divides the interior of the material trough into an upper chamber (18) and a lower chamber (19), and the sieve plate is provided thereon with a plurality of through holes (17). The screw shaft is rotatably arranged in the upper chamber. A rotating shaft of the motor is connected to a power input shaft of the reduction box, and a power output shaft

of the reduction box is connected to one end of the screw shaft. One end of the material trough is provided with a first discharge port (23) that communicates with the upper chamber, and the other end of the material trough is provided with a second discharge port (24) that communicates with the lower chamber. A discharge port of the extrusion separation device body is located above a notch of the material trough. The aforementioned extrusion separation and purification device improves dry-wet separation efficiency and may effectively remove impurities in wet component materials.

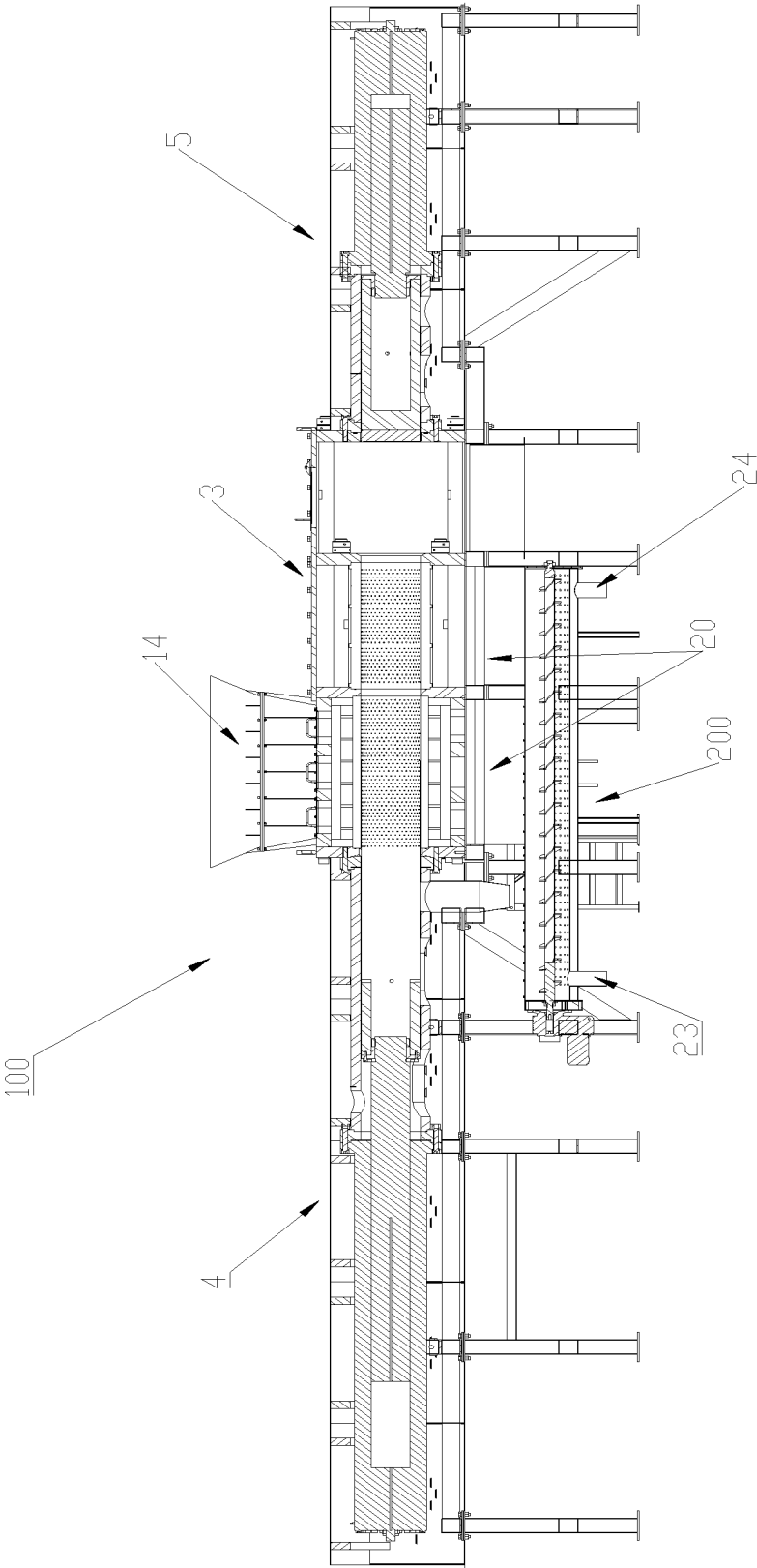


Fig. 1

Description

FIELD OF THE UTILITY MODEL

[0001] The utility model relates to the field of garbage processing, and in particular to an extrusion separation and purification device.

BACKGROUND OF THE UTILITY MODEL

[0002] In existing dry-wet separation type garbage extrusion separation devices, a feeding mechanism, a pre-compression mechanism, an extrusion mechanism and a discharge mechanism are typically disposed on the outside of a machine body. The feeding mechanism is arranged perpendicular to the pre-compression mechanism. The pre-compression mechanism, the extrusion mechanism and the discharge mechanism are arranged in parallel with each other, and axes thereof are located on the same circumferential line, with the axes being spaced apart from each other by 120 degrees. A rotating mechanism is disposed on a central axis inside the machine body, and is arranged coaxially or in parallel with a driving mechanism. The driving mechanism is disposed on the outside of the machine body. In the above described device, there exists a phenomenon of material sticking during the rotation of the pre-compression mechanism, the extrusion mechanism and the discharge mechanism, resulting in the inability to operate continuously and low efficiency. In addition, the existing extrusion separation devices cannot purify the processed wet-component materials, which results in a lot of impurities.

SUMMARY OF THE UTILITY MODEL

[0003] The object of the embodiments of the utility model is to provide an extrusion separation and purification device, aiming at solving the problems that the existing extrusion separation devices have low separation efficiency and low reliability, and that impurities are contained in the processed wet-component materials.

[0004] In order to achieve the above object, embodiments of the utility model provide an extrusion separation and purification device which includes an extrusion separation device body, wherein the extrusion separation and purification device further includes a purification device, the purification device includes a material trough, a screw shaft, a motor and a reduction box; a sieve plate is disposed in the interior of the material trough along a length direction of the material trough, the sieve plate divides the interior of the material trough into an upper chamber and a lower chamber, and the sieve plate is provided therein with a plurality of through holes; the screw shaft is rotatably disposed in the upper chamber, a rotating shaft of the motor is connected to a power input shaft of the reduction box, and a power output shaft of the reduction box is connected to one end of the screw shaft; one end of the material trough is provided with a

first discharge port in communication with the upper chamber, and the other end of the material trough is provided with a second discharge port in communication with the lower chamber; a discharge port of the extrusion separation device body is located above a notch of the material trough.

[0005] Preferably, the purification device further includes a plurality of support brackets, which are disposed below the material trough.

[0006] Preferably, the through holes are evenly arranged in the sieve plate.

[0007] Preferably, the extrusion separation device body includes a feed pusher assembly, a feed box assembly, an extrusion and discharge assembly, a main extrusion guiding assembly, and an anti-extrusion guiding assembly; the main extrusion guiding assembly, the feed box assembly, the extrusion and discharge assembly, and the anti-extrusion guiding assembly are located on the same horizontal axis and connected in sequence; the feed pusher assembly is connected to the feed box assembly and disposed perpendicular to the horizontal axis, and the feed pusher assembly and the feed box assembly cooperate to form a cylindrical pre-compression chamber; the feed pusher assembly includes a pre-compression room, a feed hopper connected to an upper end of the pre-compression room, an oil cylinder connected to one end of the pre-compression room, and a pusher located in the pre-compression room; a front end of a piston rod of the oil cylinder is connected with the pusher; a front end of the pusher has an arc shape smaller than a semi-circle.

[0008] Preferably, there are two oil cylinders in the feed pusher assembly, and the front ends of the piston rods of the two oil cylinders are respectively connected to the pusher.

[0009] Preferably, two side walls inside the pre-compression room are respectively provided with rectangular guide rails, and the pusher moves along the rectangular guide rails.

[0010] Preferably, the feed box assembly includes a feed box body and a sieve cylinder-like side wall larger than a semi-circle located inside the feed box body, and the sieve cylinder-like side wall is fixedly supported inside the feed box body.

[0011] Embodiments of the utility model have the following advantages:

[0012] In the embodiment of the utility model, the front end of the pusher of the extrusion separation and purification device has an arc shape smaller than a semi-circle. When the pusher advances to the feed box assembly, the pusher and the side wall larger than a semi-circle located inside the feed box assembly can form the cylindrical pre-compression chamber; as compared with the prior art in which both of them have a semicircular shape, the utility model is advantageous for increasing the compression ratio, and thus improves the dry-wet separation efficiency.

[0013] 2. In the embodiment of the utility model, the

pusher of the extrusion separation and purification device is driven by two oil cylinders, which further improves the dry-wet separation efficiency; meanwhile, the guide rails are rectangular; as compared with the prior art in which the pusher is driven by a single oil cylinder and the guide rails have a triangular structure, the pusher is subject to even forces, and the problem of the guide rails and the pusher being stuck will not be easy to occur, which further improves the dry-wet separation efficiency.

[0014] 3. In the embodiment of the utility model, by adding the purification device, the extrusion separation and purification device can purify the wet-component materials processed by the extrusion separation device body, thus removing impurities in the wet-component materials and providing high-quality raw materials for the subsequent process.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

FIG. 1 is a schematic structural view of an extrusion separation and purification device in an embodiment of the utility model in a front cross-sectional view.

FIG. 2 is a schematic structural view of a purification device in an embodiment of the utility model in a front cross-sectional view.

FIG. 3 is a schematic structural view of an extrusion separation device body in an embodiment of the utility model in a perspective view.

FIG. 4 is a schematic structural view of an extrusion separation device body in an embodiment of the utility model in a plan view.

FIG. 5 is a schematic structural view taken along the cross-sectional line A-A in FIG. 4.

FIG. 6 is a schematic structural view taken along the cross-sectional line B-B in FIG. 4.

FIG. 7 is a schematic structural view taken along the cross-sectional line C-C in FIG. 4.

FIG. 8 is a schematic structural view of a feed pusher assembly in an embodiment of the utility model in a perspective view.

FIG. 9 is a schematic structural view of a feed pusher assembly in an embodiment of the utility model in a plan view.

FIG. 10 is a schematic structural view taken along the cross-sectional line A-A in FIG. 9.

FIG. 11 is a schematic structural view of a feed box

assembly in an embodiment of the utility model.

FIG. 12 is a schematic structural view taken along the cross-sectional line A-A in FIG. 11.

DETAILED DESCRIPTION OF THE EMBODIMENT(S) OF THE UTILITY MODEL

[0016] The following embodiments are used to illustrate the utility model, and are not intended to limit the scope of the utility model.

[0017] As shown in FIGS. 1, 3, 4, 5, 6 and 7, an extrusion separation and purification device includes an extrusion separation device body 100 and a purification device 200, wherein the extrusion separation device body 100 includes a feed pusher assembly 1, a feed box assembly 2, an extrusion and discharge assembly 3, a main extrusion guiding assembly 4, and an anti-extrusion guiding assembly 5. The main extrusion guiding assembly 4, the feed box assembly 2, the extrusion and discharge assembly 3, and the anti-extrusion guiding assembly 5 are located on the same horizontal axis and are connected in sequence; the feed pusher assembly 1 is connected to the feed box assembly 2 and is disposed perpendicular to the above horizontal axis, and the feed pusher assembly 1 and the feed box assembly 2 cooperate to form a cylindrical pre-compression chamber.

[0018] As shown in FIGS. 8-10, the feed pusher assembly 1 includes a pre-compression room 12, a feed hopper 14 connected to an upper end of the pre-compression room 12, two oil cylinders 11 connected to one end of the pre-compression room 12, and a pusher 13 located in the pre-compression room 12. Front ends of piston rods of the two oil cylinders 11 are respectively connected to the pusher 13, and the two oil cylinders 11 are used to drive the pusher 13, thereby further improving the dry-wet separation efficiency of the device. A front end of the pusher 13 has an arc shape smaller than a semi-circle. When the pusher 13 advances to the feed box assembly 2, it can form a cylindrical pre-compression chamber with a side wall larger than a semi-circle inside the feed box assembly 2. Two side walls in the pre-compression room 12 are respectively provided with rectangular guide rails 15, and the pusher 13 moves along the rectangular guide rails 15.

[0019] As shown in FIGS. 11 and 12, the feed box assembly 2 includes a feed box body 22 and a sieve cylinder-like side wall 21 larger than a semi-circle located inside the feed box body 22, and the sieve cylinder-like side wall 21 is fixedly supported in the feed box body 22. The sieve cylinder-like side wall 21 is configured to cooperate with the front end of the pusher 13. The arrangement of the feed box assembly 2 of the utility model is advantageous for improving the reliability of the device as compared with the traditional screw connection.

[0020] As shown in FIGS. 4 and 5, the main extrusion guiding assembly 4 includes an oil cylinder 41, a guide sleeve 42 and a guide post 43. A flange of the oil cylinder

41 is connected to the guide sleeve 42, and a piston rod of the oil cylinder 41 is connected to the guide post 43. The piston rod and the guide post 43 may move along the interior of the guide sleeve 42, extend into the cylindrical pre-compression chamber in the feed box assembly 2, and then extend into the extrusion and discharge assembly 3. The extrusion and discharge assembly 3 includes a main sieve cylinder 31 and a discharge mechanism 32. A material passage opening 20, which serves as a discharge port of the extrusion separation device body 100, is provided at a lower part of the discharge mechanism 32, and wet-component materials processed by the extrusion separation device body 100 are conveyed to the purification device 200 for purification.

[0021] The anti-extrusion guiding assembly 5 includes an oil cylinder 51 and a guide sleeve 52, a flange of the oil cylinder 51 is connected to the guide sleeve 52, and a piston rod of the oil cylinder 51 is connected to a guide post 53. The piston rod and the guide post 53 may move along the interior of the guide sleeve 52, extend into the discharge mechanism 32 in sequence, and may close one end of the main sieve cylinder 31.

[0022] As shown in FIG. 2, the purification device 200 includes a material trough 7, a screw shaft 8, a motor 9, and a reduction box 10. The material trough 7 has a trough structure with an upper opening, and the material trough 7 is located below the material passage opening 20. Wet-component materials processed by the extrusion separation device body 100 enter the material trough 7 through the material passage opening 20. A plurality of support brackets are provided at a lower part of the material trough 7 for supporting the purification device 200, and a sieve plate 16 is provided inside the material trough 7 along a length direction of the material trough 7. The sieve plate 16 has a certain arc to ensure the wet-component materials are located in the middle of the sieve plate 16. The sieve plate 16 divides the interior of the material trough 7 into an upper chamber 18 above the sieve plate 16 and a lower chamber 19 below the sieve plate 16. The sieve plate 16 is provided therein with a plurality of through holes 17. The through holes 17 are evenly disposed in the sieve plate 16. The screw shaft 8 is rotatably disposed in the upper chamber 18, a rotating shaft of the motor 9 is connected to a power input shaft of the reduction box 10, and a power output shaft of the reduction box 10 is connected to one end of the screw shaft 8. One end of the material trough 7 is provided with a first discharge port 23 in communication with the upper chamber 18, and the first discharge port 23 is configured to discharge the purified wet-component materials. The other end of the material trough 7 is provided with a second discharge port 24 in communication with the lower chamber 19, and the second discharge port 24 is configured to discharge the separated impurities and moisture. By integrating the extrusion separation device body 100 with the purification device 200, not only a new purification function is added, but also a high degree of integration of the entire set of device is achieved, thereby

reducing the space occupied by the entire set of device.

[0023] The working principle of the extrusion separation and purification device (taking one cycle of extrusion separation as an example) includes:

[0024] (1) Feeding and pre-compression: Materials such as kitchen and household garbage as well as other water-containing garbage, such as lees, vinegar residues, etc., enter the device through the feed hopper 14; at this point, the pusher 13 is in a retracted position, the piston rod of the oil cylinder 11 drives the pusher 13 to move toward the feed box assembly 2 along the guide rails 15, and the pusher 13 pushes the garbage into the feed box assembly 2; the garbage is pre-compressed into the cylindrical pre-compression chamber formed by the front end of the pusher 13 and the sieve cylinder-like side wall 21 so that a pre-compression function is completed.

[0025] (2) Extrusion: The piston rod in the oil cylinder 51 of the anti-extrusion guiding assembly 5 and the guide post 53 move along the guide sleeve 52 and block the end of the main sieve cylinder 31. The piston rod in the oil cylinder 41 of the main extrusion guiding assembly 4 and the guide post 43 move along the guide sleeve 42 to further press the pre-compressed garbage into the main sieve cylinder 31, where a predetermined pressure is reached and the pressure is maintained to complete the extrusion function.

[0026] (3) Discharge: The piston rod in the oil cylinder 51 of the anti-extrusion guiding assembly 5 drives the guide post 53 to move back to its original position, the piston rod in the oil cylinder 41 of the main extrusion guiding assembly 4 drives the guide post 43 to continue to move forward and discharge the dry materials through the discharge mechanism 32, and the wet-component materials are conveyed to the purification device 200 through the material passage opening 20 of the discharge mechanism 32 for purification.

[0027] (4) Purification: After the wet-component materials enter the material trough 7, the motor 9 rotates, and the motor 9 drives the screw shaft 8 to rotate through the reduction box 10. Under the action of the screw shaft 8, the wet-component materials move toward one end of the material trough 7 along the sieve plate 16. During the movement, impurities and moisture in the wet-component materials enter the lower chamber 19 through the through holes 17 in the sieve plate 16 and are finally discharged through the second discharge port 24. The purified materials are discharged through the first discharge port 23.

[0028] While the utility model is described in detail with reference to the general description and specific embodiments above, it is apparent to those skilled in the art that some modifications or improvements may be made based on the utility model. Therefore, such modifications or improvements made without departing from the spirit of the utility model will all fall within the scope of protection of the utility model.

Claims

1. An extrusion separation and purification device, comprising an extrusion separation device body, wherein the extrusion separation and purification device further comprises a purification device, the purification device comprises a material trough, a screw shaft, a motor and a reduction box; a sieve plate is disposed in the interior of the material trough along a length direction of the material trough, the sieve plate divides the interior of the material trough into an upper chamber and a lower chamber, and the sieve plate is provided therein with a plurality of through holes; the screw shaft is rotatably disposed in the upper chamber, a rotating shaft of the motor is connected to a power input shaft of the reduction box, and a power output shaft of the reduction box is connected to one end of the screw shaft; one end of the material trough is provided with a first discharge port in communication with the upper chamber, and the other end of the material trough is provided with a second discharge port in communication with the lower chamber; a discharge port of the extrusion separation device body is located above a notch of the material trough.

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2. The extrusion separation and purification device according to claim 1, wherein the purification device further comprises a plurality of support brackets, which are disposed below the material trough.

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3. The extrusion separation and purification device according to claim 2, wherein the through holes are evenly arranged in the sieve plate.

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4. The extrusion separation and purification device according to claim 3, wherein the extrusion separation device body comprises a feed pusher assembly, a feed box assembly, an extrusion and discharge assembly, a main extrusion guiding assembly, and an anti-extrusion guiding assembly; the main extrusion guiding assembly, the feed box assembly, the extrusion and discharge assembly, and the anti-extrusion guiding assembly are located on the same horizontal axis and connected in sequence; the feed pusher assembly is connected to the feed box assembly and disposed perpendicular to the horizontal axis, and the feed pusher assembly and the feed box assembly cooperate to form a cylindrical pre-compression chamber; the feed pusher assembly comprises a pre-compression room, a feed hopper connected to an upper end of the pre-compression room, an oil cylinder connected to one end of the pre-compression room, and a pusher located in the pre-compression room; a front end of a piston rod of the oil cylinder is connected with the pusher.

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5. The extrusion separation and purification device according to claim 4, wherein there are two oil cylinders in the feed pusher assembly, and the front ends of the piston rods of the two oil cylinders are respectively connected to the pusher.

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6. The extrusion separation and purification device according to claim 5, wherein two side walls inside the pre-compression room are respectively provided with rectangular guide rails, and the pusher moves along the rectangular guide rails.

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7. The extrusion separation and purification device according to claim 5 or 6, wherein the feed box assembly comprises a feed box body and a sieve cylinder-like side wall larger than a semi-circle located inside the feed box body, and the sieve cylinder-like side wall is fixedly supported inside the feed box body.

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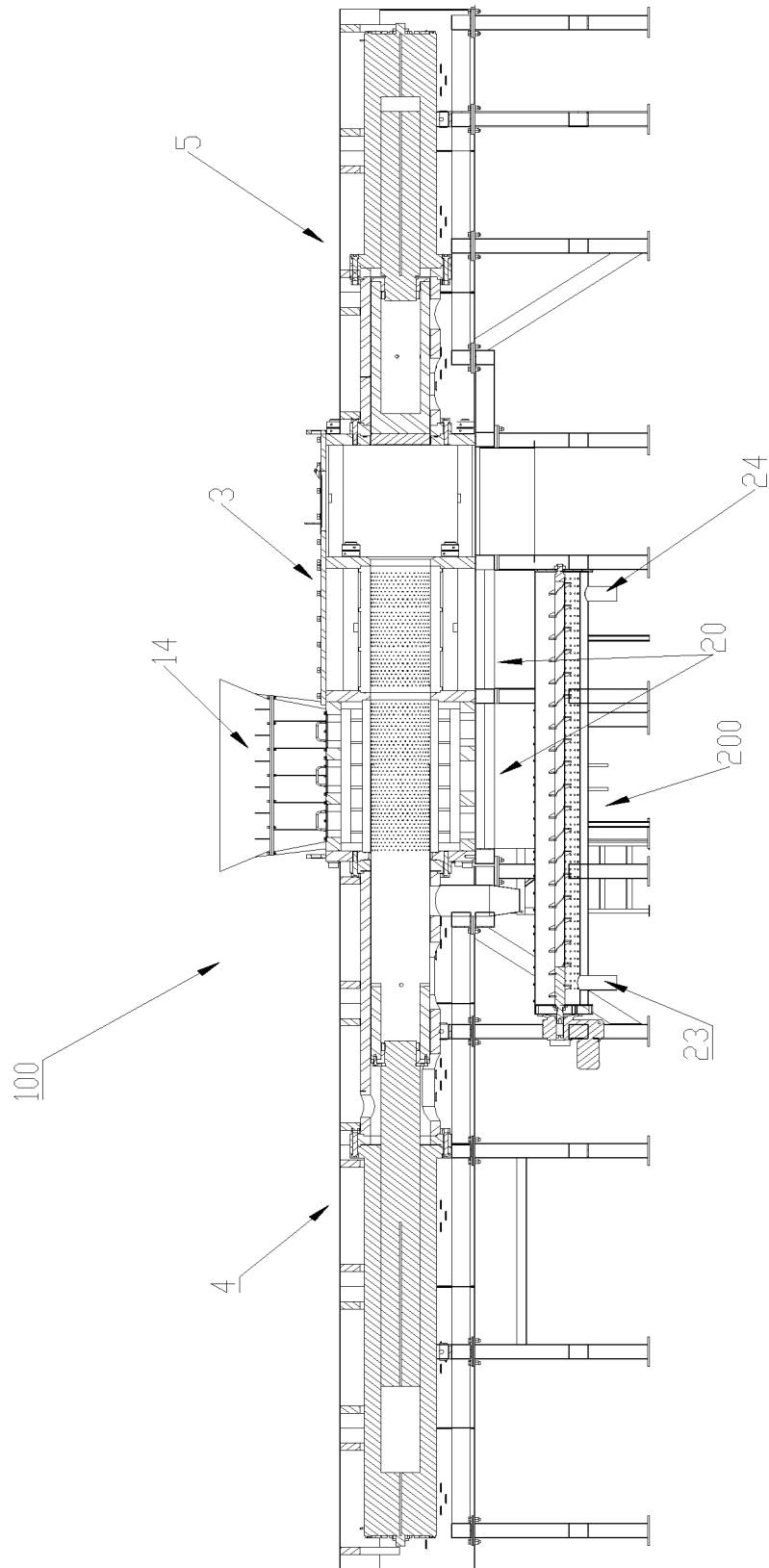


Fig. 1

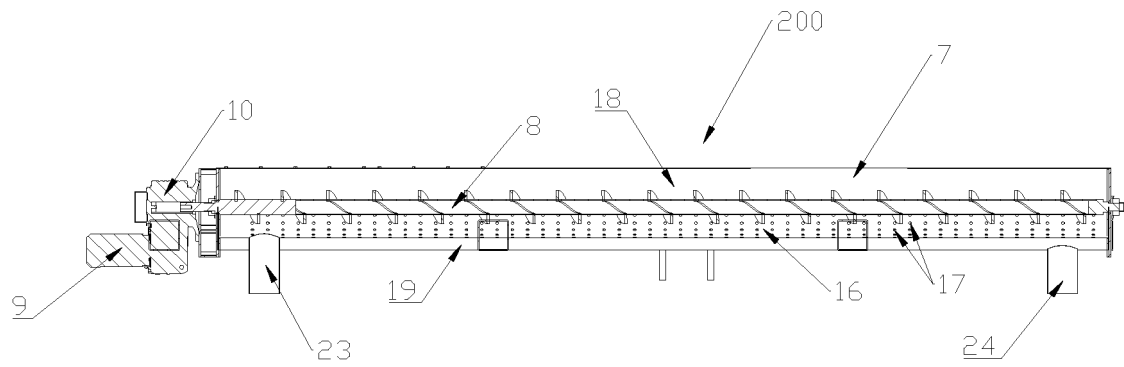


Fig. 2

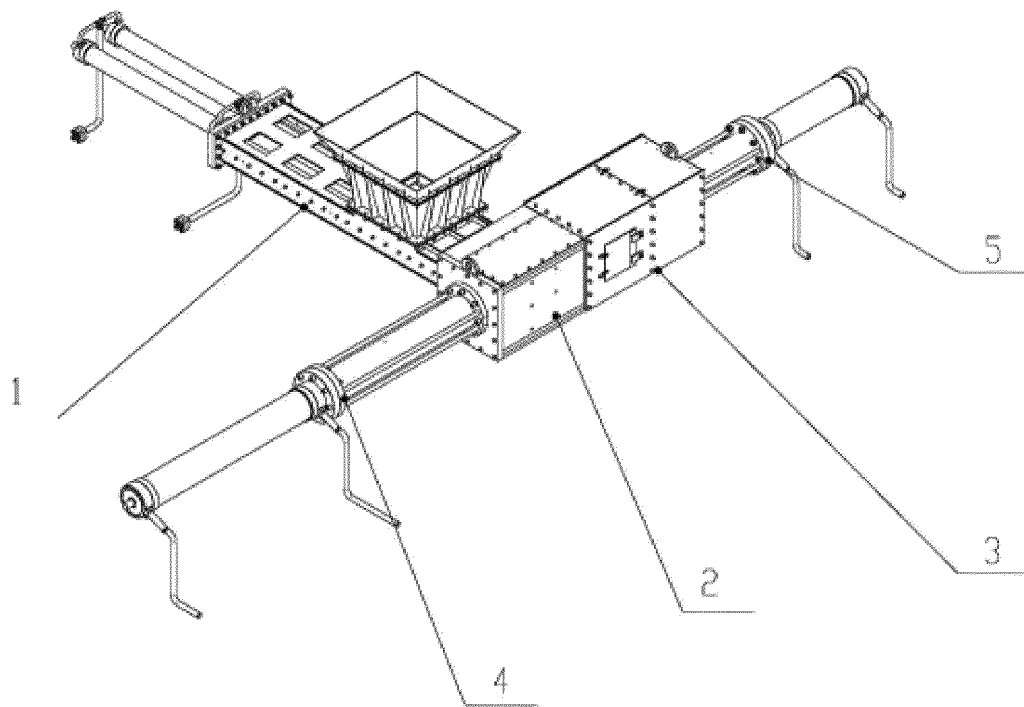


Fig. 3

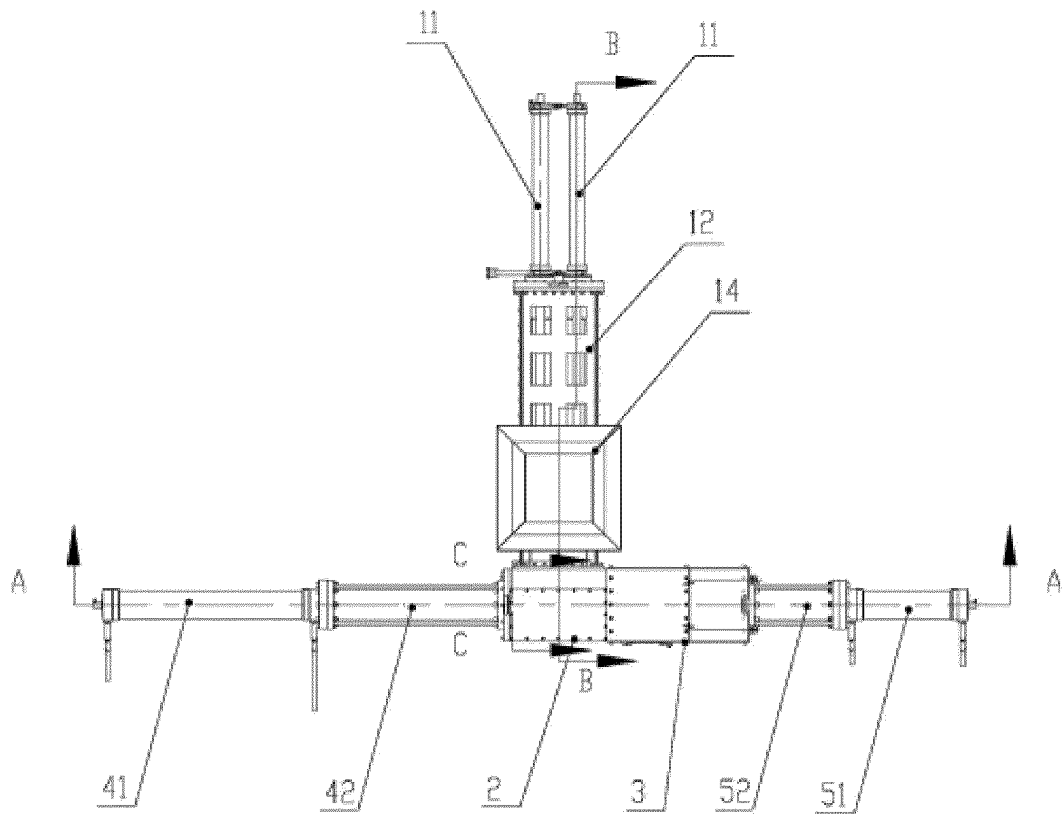


Fig. 4

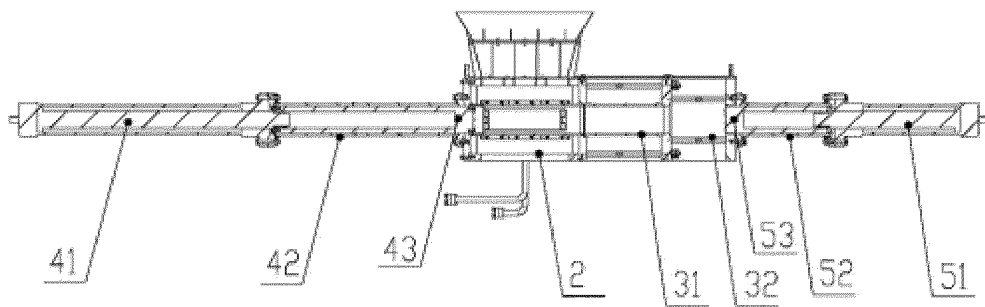


Fig. 5

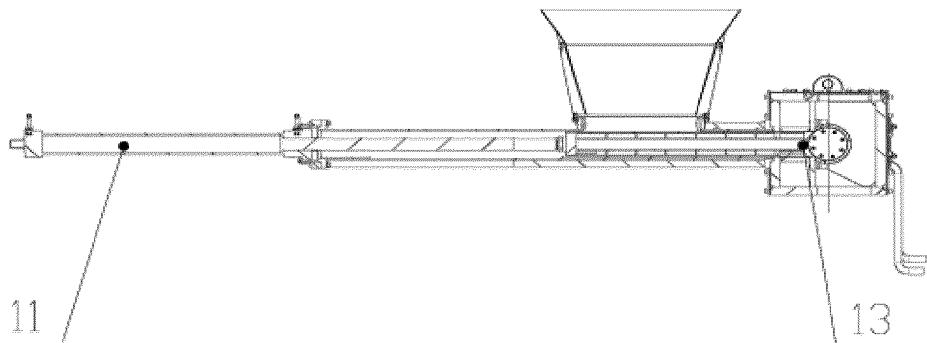


Fig. 6

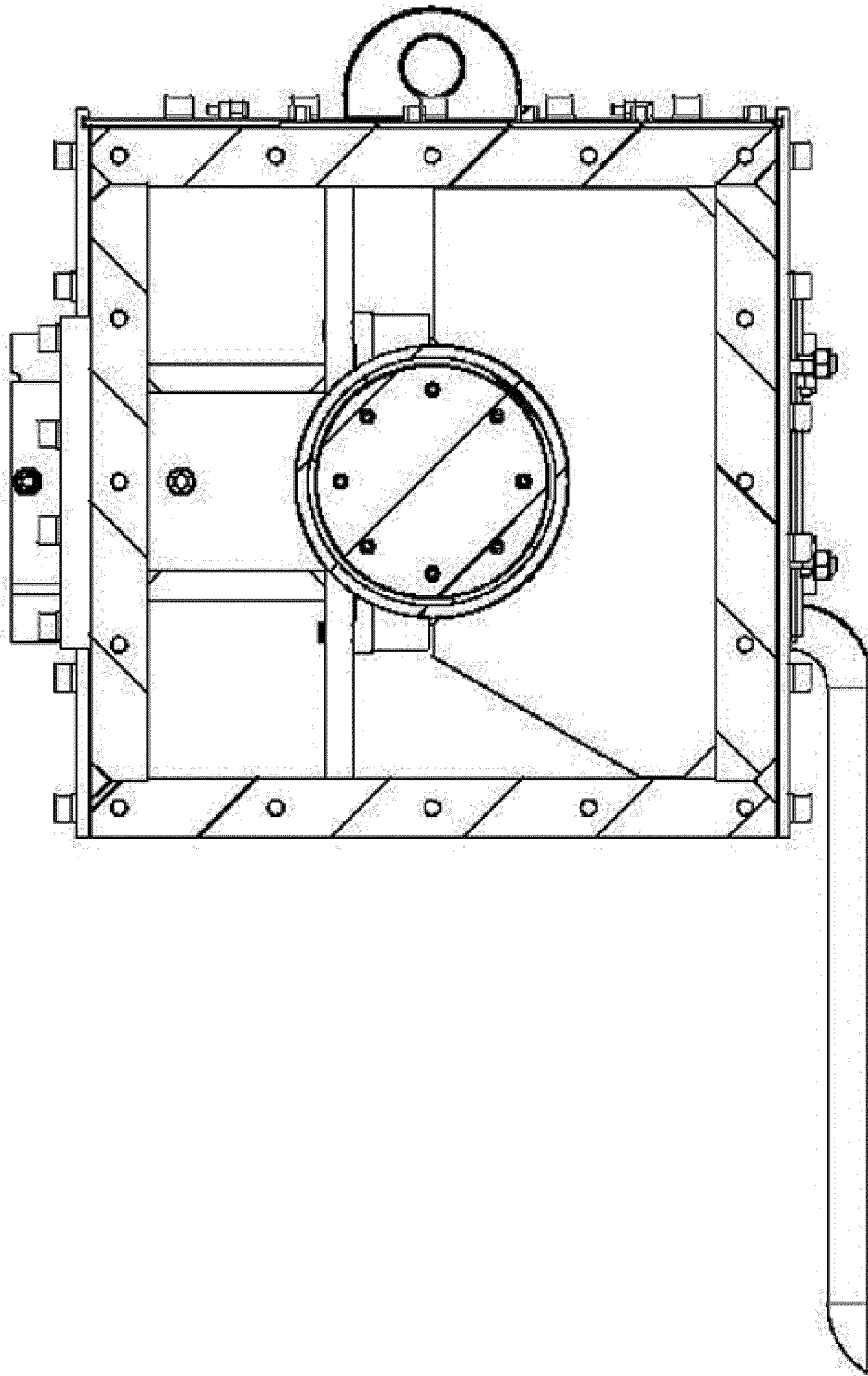


Fig. 7

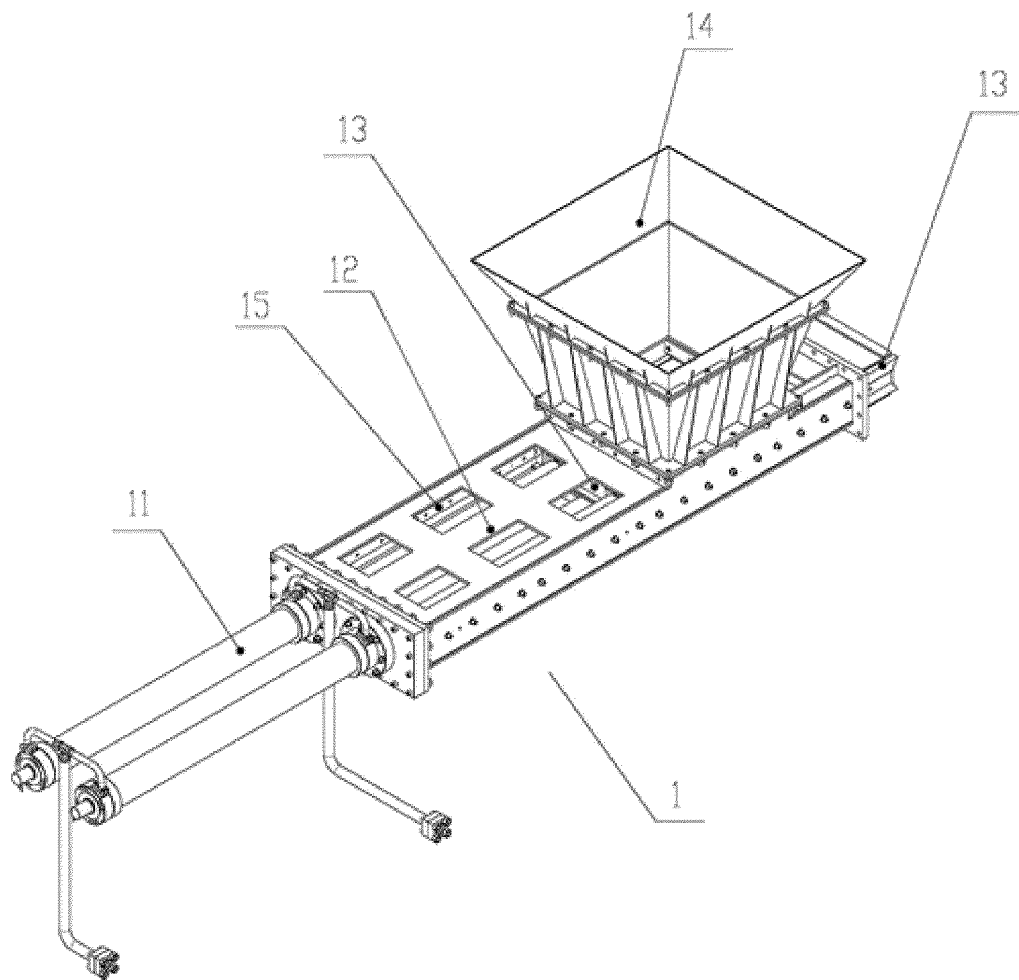


Fig. 8

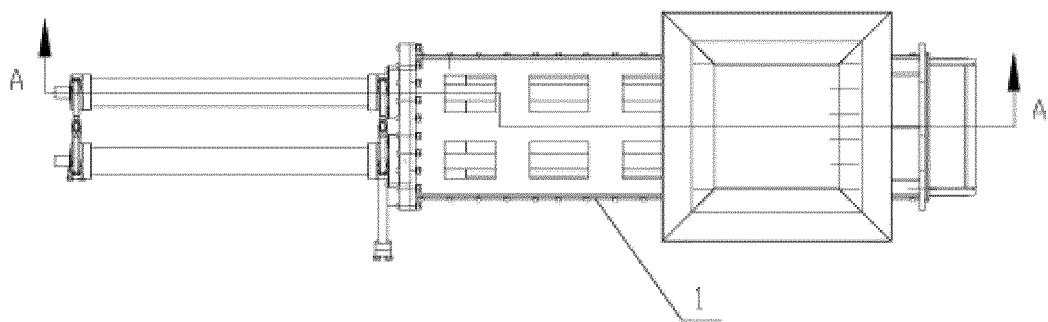


Fig. 9

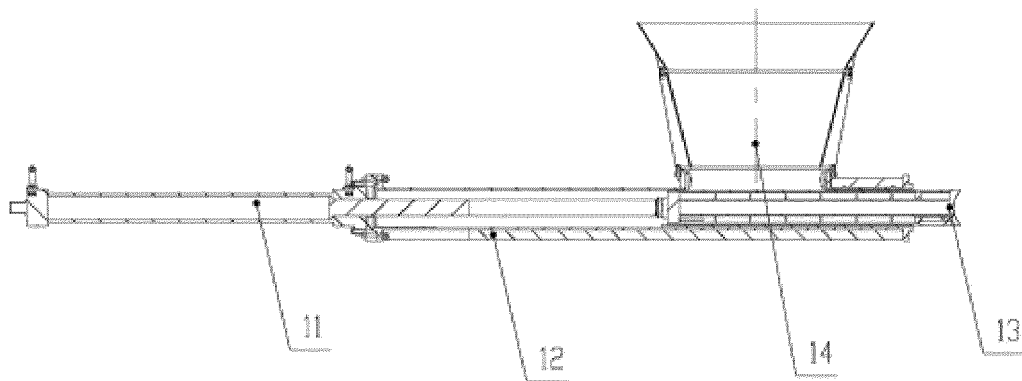


Fig. 10

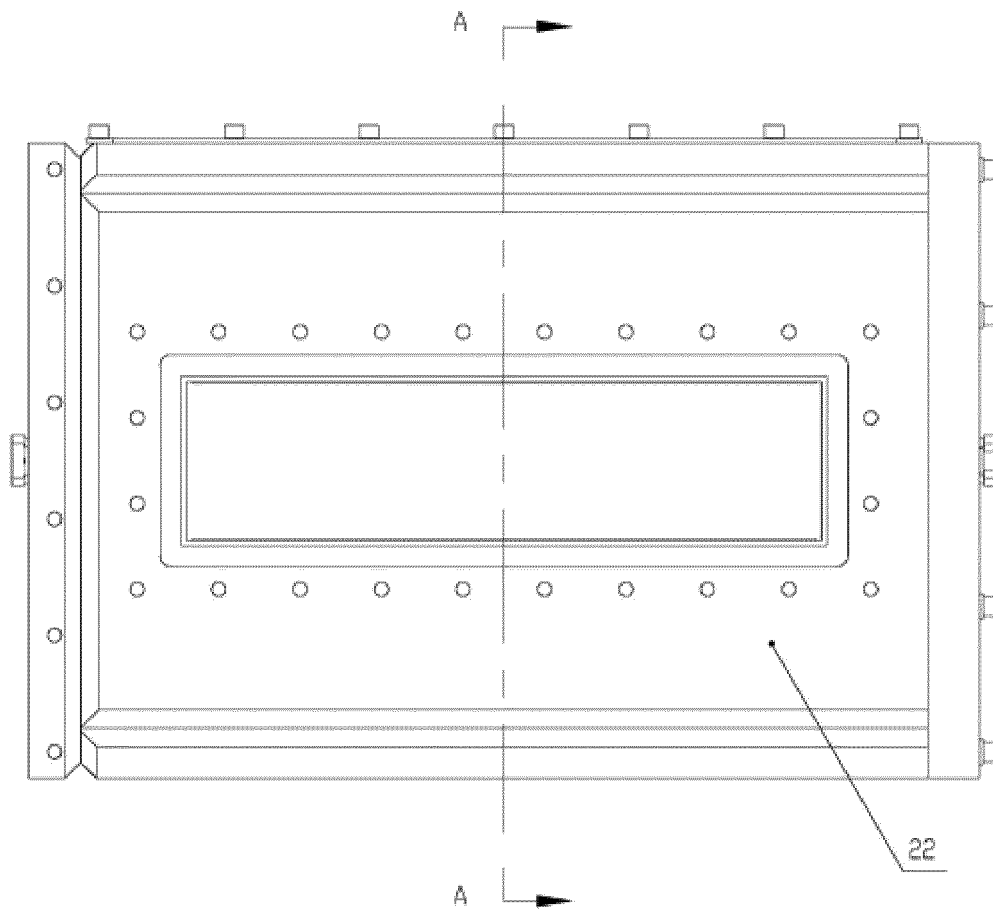


Fig. 11

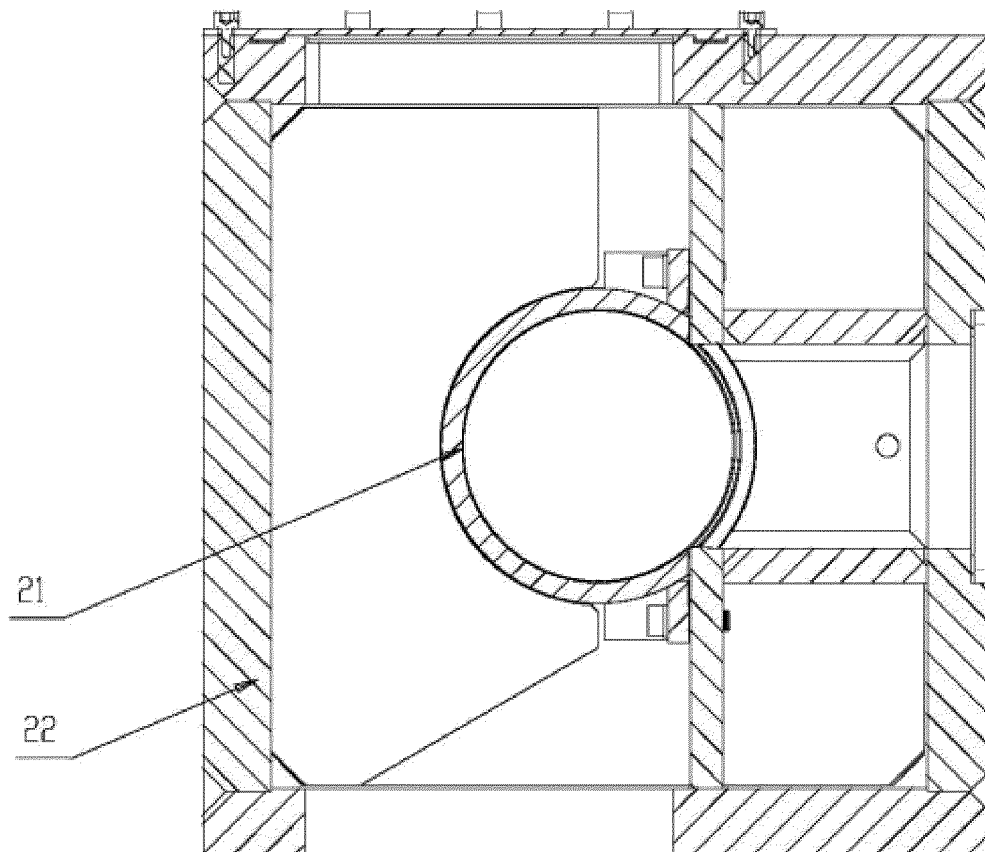


Fig. 12

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2019/073487

A. CLASSIFICATION OF SUBJECT MATTER B30B 9/06(2006.01)i According to International Patent Classification (IPC) or to both national classification and IPC																		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) B30B, B09B Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched																		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) CNABS, CNTXT, CNKI, VEN: 垃圾, 挤压, 压缩, 压榨, 脱水, 提纯, 螺旋, 筛, 板, 孔, 湿, 电机, 驱动, waste, garbage, rubbish, squeeze+, press, extrud+, dewater, dehydrat+, purif+, screw, spiral, screen, sieve, plate, hole, pore, wet, motor, driv+																		
C. DOCUMENTS CONSIDERED TO BE RELEVANT																		
<table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>Y</td> <td>CN 108015099 A (HUBEI EGUARD ENVIRONMENTAL EQUIPMENT CO., LTD.) 11 May 2018 (2018-05-11) see description, paragraphs [0019]-[0023], and figure 1</td> <td>1-7</td> </tr> <tr> <td>Y</td> <td>CN 205112460 U (SHANGHAI ENVIRONMENTAL ENGINEERING TECHNOLOGY CO., LTD.) 30 March 2016 (2016-03-30) see description, paragraphs [0022]-[0028], and figure 2</td> <td>1-7</td> </tr> <tr> <td>A</td> <td>CN 202344873 U (FOSHAN ANDRITZ TECHNOLOGIES CO., LTD.) 25 July 2012 (2012-07-25) see entire document</td> <td>1-7</td> </tr> <tr> <td>A</td> <td>CN 106113552 A (SHENZHEN GREEN HOMELAND TECHNICAL CO., LTD.) 16 November 2016 (2016-11-16) see entire document</td> <td>1-7</td> </tr> <tr> <td>A</td> <td>CN 106734114 A (TUS-SOUND ENVIRONMENTAL RESOURCES CO., LTD. ET AL.) 31 May 2017 (2017-05-31) see entire document</td> <td>1-7</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	Y	CN 108015099 A (HUBEI EGUARD ENVIRONMENTAL EQUIPMENT CO., LTD.) 11 May 2018 (2018-05-11) see description, paragraphs [0019]-[0023], and figure 1	1-7	Y	CN 205112460 U (SHANGHAI ENVIRONMENTAL ENGINEERING TECHNOLOGY CO., LTD.) 30 March 2016 (2016-03-30) see description, paragraphs [0022]-[0028], and figure 2	1-7	A	CN 202344873 U (FOSHAN ANDRITZ TECHNOLOGIES CO., LTD.) 25 July 2012 (2012-07-25) see entire document	1-7	A	CN 106113552 A (SHENZHEN GREEN HOMELAND TECHNICAL CO., LTD.) 16 November 2016 (2016-11-16) see entire document	1-7	A	CN 106734114 A (TUS-SOUND ENVIRONMENTAL RESOURCES CO., LTD. ET AL.) 31 May 2017 (2017-05-31) see entire document	1-7
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☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.																		
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<table border="1"> <tr> <td>Date of the actual completion of the international search 14 March 2019</td> <td>Date of mailing of the international search report 03 April 2019</td> </tr> </table>	Date of the actual completion of the international search 14 March 2019	Date of mailing of the international search report 03 April 2019																
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<table border="1"> <tr> <td>Name and mailing address of the ISA/CN China National Intellectual Property Administration (ISA/CN) No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088 China Facsimile No. (86-10)62019451</td> <td>Authorized officer Telephone No.</td> </tr> </table>	Name and mailing address of the ISA/CN China National Intellectual Property Administration (ISA/CN) No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088 China Facsimile No. (86-10)62019451	Authorized officer Telephone No.																
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2019/073487

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 106734083 A (BEIJING ENVIRONMENTAL ENGINEERING TECHNOLOGY CO., LTD.) 31 May 2017 (2017-05-31) see entire document	1-7
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Information on patent family members

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