

STORAGE AND DISCHARGE DEVICE

CROSS-REFERENCE TO RELATED APPLICATION

Priority is claimed on Japanese Patent Application No. 2016-170215, filed

5 August 31, 2016, the content of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

[0001]

10 The present invention relates to a storage and discharge device.

[0002]

Pneumatic trash transport systems which allows disposal of trash that has passed through trash inlet ports provided in each floor of, for example, a multiple-dwelling structure with a plurality of floors such as an apartment to simplify trash waste of residents have been adopted.

15

Trash (dust) fed through trash inlet ports falls into input chutes vertically passing through a multiple-dwelling structure, and then is stored in rotating drum type storage and discharge devices provided for each input chute. The trash is temporarily stored in the storage and discharge devices and appropriately collected by trash collecting vehicles.

20

[0003]

The device disclosed in Patent Document 1 is known as a storage and discharge device (a dust processing device) provided in a pneumatic trash transport system. In the storage and discharge device, an air flow is generated in a transport pipe by suctioning air inside a rotating drum using an air blower (a blower), and trash and the air are introduced

25

into the rotating drum. The trash falls into the rotating drum, and the air is suctioned into the air blower through an intake pipe.

Description of Related Art

[Patent Documents]

5 [0004]

[Patent Document 1] Japanese Examined Patent Application, Second
Publication No. S61-27284

SUMMARY OF THE INVENTION

10 [0005]

However, in the storage and discharge device disclosed in Patent Document 1, a diameter of a fixed part constituted of a transport pipe serving as a receiving part of trash and air, an intake pipe configured to suction the air, and a filter is large. Furthermore, a seal mechanism configured to secure high airtightness of the rotating drum while
15 allowing rotation of the rotating drum needs to be provided between the fixed part and the rotating drum. However, when the diameter of the fixed part is large, there is a problem with difficulty of secureness of high airtightness for the seal mechanism. To be specific, there is a problem in that it is necessary to use a bearing or the like with a large diameter and high airtightness as the seal mechanism, and manufacturing costs are
20 increased.

[0006]

Also, when the trash is raised as the rotating drum rotates, a part of the filter is blocked by the trash in some cases. There is a problem in that the flow rate of air passing through the filter increases when the part of the filter is blocked.

25 [0007]

An objective of the present invention is to provide a storage and discharge device in which a seal mechanism between a fixed part such as a transport pipe and an intake pipe and a rotating drum can be further simplified, and ventilation holes of a filter can be prevented from being blocked.

5 [0008]

According to a first aspect of the present invention, a storage and discharge device includes: a rotating drum having feed blades therein and configured to convey a subject to be processed to an axial downstream side when the rotating drum rotates about an axis; an introduction pipe formed in a cylindrical shape coaxial with the axis, disposed
10 from an axial upstream side to an axial downstream side of an end wall of the rotating drum at the axial upstream side, and configured to introduce a solid into the rotating drum together with air; and an exhaust part through which an internal space of the rotating drum is connected to a negative pressure source, wherein the exhaust part includes: an exhaust pipe which is formed in a cylindrical shape coaxial with the axis at
15 an outer side of the introduction pipe in a radial direction, which extends over an interior and exterior of the end wall, and in which an axial upstream side end portion thereof is connected to the negative pressure source; a tubular net having a plurality of ventilation holes communicating with an internal space of the rotating drum, and provided in a portion of the exhaust pipe at the axial downstream side; and a seal mechanism
20 configured to seal between the exhaust pipe and the rotating drum, and the tubular net includes: a rear end surface protruding from an end portion of the exhaust pipe at the axial downstream side to an outer side thereof in the radial direction; a tubular-shaped tubular part connected to an end portion of the outer side of the rear end surface in the radial direction; a front end surface protruding from a portion near an end portion of the
25 introduction pipe at the axial downstream side to an outer side thereof in the radial

direction; a tapered part configured to connect an end portion of the tubular part at the axial downstream side and an end portion of the outer side of the front end surface in the radial direction and gradually narrowed to the axial downstream side; and a blocking part configured to block the tapered part from a range of 180° to 270° with respect to a lower
5 end of the tapered part in a rotational direction of the rotating drum when viewed from the axial downstream side.

[0009]

With such a constitution, the introduction pipe and the exhaust pipe have a double pipe structure so that diameters of the introduction pipe and the exhaust pipe can
10 be reduced, and a seal mechanism between the exhaust pipe and the rotating drum can be further simplified.

Also, when a subject to be processed stored in the rotating drum and raised upward when the rotating drum rotates falls onto the tapered part, the subject to be processed can fall onto the blocking part smoothly. Furthermore, since the blocking part
15 is disposed at a place at which the subject to be processed falls, the ventilation holes are blocked by the subject to be processed so that fluctuation of a flow rate of air generated by the negative pressure source can be prevented.

[0010]

In the storage and discharge device, the introduction pipe may protrude from the
20 front end surface to the axial downstream side.

[0011]

With such a constitution, the subject to be processed stored in the rotating drum comes into contact with the tubular net so that the tubular net can be prevented from being damaged.

25 [0012]

The storage and discharge device may include a second blocking part configured to block the front end surface in a range of at least $\pm 45^\circ$ with respect to an upper end of the front end surface in a circumferential direction of the axis.

[0013]

- 5 With such a constitution, a flow rate generated using the negative pressure source can be prevented from fluctuating due to the subject to be processed deposited above the introduction pipe.

[0014]

- In the storage and discharge device, the feed blades may include first feed blades
10 disposed in a range in which the introduction pipe extends and second feed blades disposed at the axial downstream side of the first feed blades, wherein the second feed blades are disposed such that part of the second feed blades and part of the tubular net overlap when viewed from the axial direction.

[0015]

- 15 With such a constitution, heights of the second feed blades in the radial direction are increased so that many subjects to be processed can be blocked. Thus, a number of subjects to be processed stored in the rotating drum can be increased.

[0016]

- In the storage and discharge device, the rotating drum includes a pipe insertion
20 hole which is formed in the end wall and in which the exhaust pipe is disposed, a first flange, a second flange, and a flexible joint, the second flange is integrally formed with the end wall at the pipe insertion hole, and sealing is performed between the first flange and the exhaust pipe using the seal mechanism, and the first flange and the second flange are connected to each other using the flexible joint.

- 25 [0017]

With such a constitution, for example, even when the rotating drum vibrates, the vibration can be prevented from reaching the seal mechanism. In other words, the flange is divided into the first flange at the seal mechanism side and the second flange at the rotating drum side, and the first flange and the second flange are connected to each other using the flexible joint so that motion at the rotating drum side can be absorbed using the flexible joint.

Also, since the introduction pipe and the rotating drum need not be precisely disposed to be coaxial with each other using the flexible joint and can be disposed to be substantially coaxial with each other, that is, in a coaxial shape, installation thereof becomes easy.

[0018]

With such a constitution, the introduction pipe and the exhaust pipe have a double pipe structure so that diameters of the introduction pipe and the exhaust pipe can be reduced, and the seal mechanism between the exhaust pipe and the rotating drum can be further simplified.

Also, when a subject to be processed stored in the rotating drum and raised upward when the rotating drum rotates falls onto the tapered part, the subject to be processed can fall onto the blocking part smoothly. Furthermore, since the blocking part is disposed at a place at which the subject to be processed falls, so that fluctuation of a flow rate of air generated by the negative pressure source can be prevented.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

FIG. 1 is a cross-sectional view of a storage and discharge device according to an embodiment of the present invention.

FIG. 2 is a detailed cross-sectional view of an introduction pipe and an exhaust part in the storage and discharge device according to the embodiment of the present invention.

FIG. 3 is a perspective view of a tubular net in the storage and discharge device
5 according to the embodiment of the present invention.

FIG. 4 is a diagram seen in a direction of an arrow IV of FIG. 1 and a front view viewed from a downstream side in an axial direction of the tubular net in the storage and discharge device according to the embodiment of the present invention.

FIG. 5 is a cross-sectional view taken along line V-V of FIG. 1, is a diagram for
10 describing an action of the storage and discharge device according to the embodiment of the present invention, and is a front view viewed from the downstream side in the axial direction of the tubular net in the storage and discharge device.

DETAILED DESCRIPTION OF THE INVENTION

15 [0020]

A storage and discharge device according to an embodiment of the present invention will be described in detail below with reference to the drawings.

The storage and discharge device according to this embodiment is a device which is used for a pneumatic trash transport system using a pneumatic transportation
20 system and configured to store trash and dust serving as an air-conveyed subject to be processed.

The pneumatic trash transport system includes, for example, a storage and discharge device configured to store trash through an inlet port for the trash provided in a building such as an apartment having a plurality of floors, a plurality of input chutes
25 (dust chutes) vertically passing through the building, and a transport pipe and an air

blower (a blower and a negative pressure source) by which a trash transport air flow is generated. Trash fed through the inlet port is introduced into the storage and discharge device together with an air flow of air.

[0021]

5 As shown in FIG. 1, the storage and discharge device 1 according to this embodiment includes a rotating drum 3 configured to store trash (solids), an introduction pipe 4 configured to introduce the trash into the rotating drum 3 together with the air flow of air, and an exhaust part 5 configured to exhaust air from the rotating drum 3.

Note that, in the following description, a direction in which an axis O of the
10 rotating drum 3 extends is set as an axial direction Da. Furthermore, a direction orthogonal to the axis O is set as a radial direction, a side away from the axis O in the radial direction is referred to as an outer side in the radial direction, and a side close to the axis O in the radial direction is referred to as an inner side in the radial direction. In the case of the axial direction Da, an upstream side in a conveyance direction T is
15 referred to as an axial upstream side Da1, and a downstream side in the conveyance direction T is referred to as an axial downstream side Da2.

[0022]

The rotating drum 3 has a cylindrical shape in which the axis O extends in a horizontal direction. The rotating drum 3 has an internal space 6 configured to
20 accommodate trash. The rotating drum 3 conveys the trash to the axial downstream side Da2 using self-rotation. Disposition of the rotating drum 3 is not limited to a horizontal disposition, and the rotating drum 3 may be disposed downward toward the axial downstream side Da2.

[0023]

25 Feed blades 7 (blades and screw blades) are provided inside the rotating drum 3.

The feed blades 7 function as a pushing mechanism configured to push the trash to the axial downstream side Da2. The feed blades 7 are formed in a spiral shape, and outer circumferential ends thereof are joined to an inner wall of the rotating drum 3 using welding. The feed blades 7 also rotate when the rotating drum 3 rotates.

5 [0024]

When the rotating drum 3 rotates in a predetermined rotational direction (a clockwise direction when viewed from the axial downstream side Da2 in this embodiment), the trash fed into the rotating drum 3 is pushed to the axial downstream side Da2 and compressed. In other words, the rotating drum 3 has a function of storing
10 the trash and has a function of transferring the trash by exerting a rotational force.

[0025]

A discharge opening 8 configured to discharge the trash is provided in the rotating drum 3 at the axial downstream side Da2. The discharge opening 8 has a tubular shape and is provided in an end portion of the rotating drum 3 at the axial downstream
15 side to be coaxial with the rotating drum 3.

The storage and discharge device 1 includes a drive unit 9 configured to rotate the rotating drum 3. The drive unit 9 includes an electric motor 10, a driving gear 11 provided in an output shaft of the electric motor 10, and a driven gear 12 provided in an outer circumferential surface of the rotating drum 3.

20 [0026]

The rotating drum 3 is rotatably supported by four receiving rollers 14 (only two receiving rollers 14 are illustrated in FIG. 1) from below. The rotating drum 3 is supported by two receiving rollers 14 from below near one end portion of the rotating drum 3 in the axial direction Da, and is supported by two receiving rollers 14 from below
25 near an end portion of the rotating drum 3 in the axial direction Da opposite to the one

end portion thereof.

[0027]

Each of the receiving rollers 14 is constituted of a tire-shaped roller main body 15 and a roller support table 16 configured to rotatably support the roller main body 15.

5 A cylindrical rail ring 17 is attached to a contact portion of the roller main body 15 on the outer circumferential surface of the rotating drum 3.

[0028]

As shown in FIGS. 2 and 3, the introduction pipe 4 is a cylindrical pipe disposed from the axial upstream side Da1 of an end wall 19 of the rotating drum 3 at the axial
10 upstream side Da1 to the axial downstream side Da2. In other words, the introduction pipe 4 extends from the internal space 6 in the rotating drum to the outside of the rotating drum. Furthermore, the axis O (a central axis) of the rotating drum 3 and a central axis of the introduction pipe 4 coincide (are disposed to be coaxial) with each other.

An end portion of the introduction pipe 4 at the axial upstream side is connected
15 to a transport pipe 13 serving as a receiving part of trash and air.

[0029]

The exhaust part 5 is a part used to connect the internal space 6 in the rotating drum 3 to an air blower 2 serving as a negative pressure source. The exhaust part 5 includes an exhaust pipe 20 which extends over an interior and exterior of the rotating
20 drum end wall 19, a tubular net 21 provided in the exhaust pipe 20 at the axial downstream side Da2, and a seal mechanism 29 configured to seal between the exhaust pipe 20 and the rotating drum 3.

[0030]

A portion of the exhaust pipe 20 at the axial upstream side Da1 is connected to
25 the air blower 2. The exhaust pipe 20 is a pipe formed in a cylindrical shape which is

coaxial with the axis O at the outer side in the radial direction of the introduction pipe 4. In other words, the exhaust pipe 20 and the introduction pipe 4 have a structure of a double pipe.

The tubular net 21 is a cylindrical-basket-shaped member having a plurality of ventilation holes 22 communicating with the internal space 6 in the rotating drum 3. The tubular net 21 functions as a filter (a screen) disposed between the internal space 6 in the rotating drum 3 and the exhaust pipe 20. The tubular net 21 extends to a portion near an end portion of the introduction pipe 4 at the axial downstream side Da2.

[0031]

The tubular net 21 is formed of wire gauzes 31 (for example, wire meshes), ribs 32 (a framework) configured to reinforce the wire gauzes 31, and a metal plate 38 serving as a blocking part configured to block a part of the tubular net 21. In other words, meshes of the wire gauzes 31 in the tubular net 21 are a plurality of ventilation holes 22.

The tubular net 21 is not limited to the wire gauzes 31, and can be formed of a member having ventilation holes regularly formed in a surface thereof. The tubular net 21 may be formed of, for example, a punching metal.

[0032]

A detailed shape of the tubular net 21 will be described below.

The tubular net 21 includes a disc-shaped rear end surface 23 (refer to FIG. 2) which protrudes from an end portion of the exhaust pipe 20 at the axial downstream side Da2 to the outer side in the radial direction, a cylindrical-shaped cylindrical part 24 (a tubular part) connected to an end portion of the rear end surface 23 at the outer side in the radial direction, a disc-shaped front end surface 25 which protrudes from a portion near an end portion of the introduction pipe 4 at the axial downstream side Da2 to the outer side in the radial direction, and a tapered part 26 configured to connect an end portion of

the cylindrical part 24 at the axial downstream side Da2 and an end portion of the front end surface 25 at the outer side in the radial direction.

[0033]

The rear end surface 23 is a circular part, a main surface of which is orthogonal to the axis O. The rear end surface 23 is formed of the wire gauzes 31 and not the ribs 32. In other words, the plurality of ventilation holes 22 are regularly formed in the whole surface of the rear end surface 23.

The cylindrical part 24 is a cylindrical part which is coaxial with the rotating drum 3. The whole surface of the cylindrical part 24 is formed of the wire gauzes 31 and not the ribs 32. In other words, the plurality of ventilation holes 22 are regularly formed in the whole surface of the cylindrical part 24.

[0034]

The tapered part 26 is a cone-shaped (a conical-shaped) part, a diameter of which gradually decreases toward the axial downstream side Da2.

An angle of inclination θ of the tapered part 26 with respect to a horizontal plane is appropriately set in accordance with an angle of repose of a deposit M1 of trash stored in the rotating drum 3. The tapered part 26 according to this embodiment is formed such that an angle formed between the tapered part 26 and the cylindrical part 24 is 50° . The angle formed by the tapered part 26 and the cylindrical part 24 may be 30° to 60° . In other words, an angle formed by a vertical surface including the axis O and the tapered part 26 is 30° to 60° .

The tapered part 26 need not have a linear cross-sectional shape when viewed from a circumferential direction, and may have a circular arc shape. In other words, the tapered part 26 may be gradually narrowed toward the axial downstream side Da2.

[0035]

As shown in FIG. 4, the whole surface of the tapered part 26 is not formed by the wire gauzes 31, and part of the tapered part 26 is formed by the metal plate 38 serving as a blocking part. The metal plate 38 in the tapered part 26 is formed over a range A1 of 235° with respect to a lower end of the tapered part 26 in a rotational direction R of the rotating drum 3 when viewed from the axial downstream side Da2. In other words, the ventilation holes 22 are covered in the range A1 of 235° with respect to a lower end of the tapered part 26 in a circumferential direction thereof in a clockwise direction when viewed from the axial downstream side Da2. That is to say, the tapered part 26 is blocked by the metal plate 38.

The metal plate 38 in the tapered part 26 is formed only in the range A1 of 235° with respect to the lower end of the tapered part 26 in the rotational direction R of the rotating drum 3, and the ventilation holes 22 are formed in the remaining range.

[0036]

Note that, although the metal plate 38 is provided such that the ventilation holes are blocked in this embodiment, the ventilation holes 22 of the wire gauzes 31 may be blocked by a member functioning as a blocking part, and the ventilation holes 22 of the wire gauzes 31 may be constituted to be blocked by a metal plate.

Although the above-described range is most preferable for a range in which the ventilation holes 22 are blocked, a range of $225\pm 45^\circ$ from the lower end thereof in the rotational direction R of the rotating drum 3 may be used. In other words, the range in which the ventilation holes 22 are blocked is at least a range of 180° from the lower end thereof in the rotational direction R of the rotating drum 3, and at most a range of 270° from the lower end thereof in the rotational direction R of the rotating drum 3.

[0037]

In other words, if the rotating drum 3 rotates clockwise when viewed from the

axial downstream side Da2, the ventilation holes 22 in at least a left half surface (a left half) of the tapered part 26 when viewed from the axial downstream side Da2 are covered.

If the rotating drum 3 rotates counterclockwise when viewed from the axial downstream side Da2, the ventilation holes 22 in at least a right half surface (a right half) of the

5 tapered part 26 when viewed from the axial downstream side Da2 are covered. In addition, in other words, the ventilation holes 22 in a portion on at least a circumferential surface of the rotating drum 3 which faces a circumferential surface of the rotating drum 3 rotating from the bottom toward the top are covered in the tapered part 26.

[0038]

10 The introduction pipe 4 protrudes from the front end surface 25 in the tubular net 21. A length L of the tubular net 21 in the introduction pipe 4 from the front end surface 25 is approximately 50 mm to 100 mm.

The whole surface of the front end surface 25 is not formed by the wire gauzes 31, and a part thereof is formed by a metal plate 39 (a second blocking part) functioning
15 as a blocking part. The front end surface 25 is formed by the metal plate 39 over a range A2 of $\pm 45^\circ$ from an upper end of the front end surface 25. In other words, the fan-shaped metal plate 39 is disposed above the front end surface 25, and thus the ventilation holes 22 are covered. That is to say, the front end surface 25 is blocked by the metal plate 39.

The above-described range is most preferable for a range in which the
20 ventilation holes 22 are covered.

[0039]

As shown in FIG. 2, pipe ventilation holes 33 configured to communicate an inner circumference side of the introduction pipe 4 and an outer circumference side of the introduction pipe 4 are formed in a part of the introduction pipe 4. The pipe ventilation
25 holes 33 are provided in a portion closer to the axial upstream side Da1 of the tubular net

21 than the front end surface 25 and near the front end surface 25 in the axial direction Da of the introduction pipe 4.

[0040]

The number of ventilation holes 22 formed in the tubular net 21 is determined
5 on the basis of a flow rate of air passing through the ventilation holes 22 when the storage and discharge device 1 is operated.

The flow rate of the air passing through the ventilation holes 22 is lowered as the number of ventilation holes 22 is increased. The number of ventilation holes 22 is set so that the flow rate of the air passing through the ventilation holes 22 is, for example, a
10 rate between 1 m/s and 5 m/s. The number of ventilation holes 22 according to this embodiment is set so that the flow rate of the air passing through the ventilation holes 22 becomes slow.

[0041]

The feed blades 7 in the rotating drum 3 include first feed blades 7a disposed at
15 the axial upstream side Da1 and second feed blades 7b disposed at the axial downstream side Da2.

The first feed blades 7a are provided in a range in the axial direction in which the introduction pipe 4 extends. In other words, the first feed blades 7a are provided in a range in the axial direction in which the exhaust part 5 is present.

20 Heights of the first feed blades 7a in the radial direction are heights at which the first feed blades 7a do not interfere with the tubular net 21.

[0042]

Heights of the second feed blades 7b in the radial direction are higher than the heights of the first feed blades 7a in the radial direction. To be specific, the heights of the
25 second feed blades 7b in the radial direction may be heights corresponding to 100% of an

interval between an inner circumferential surface of the rotating drum 3 and the axis O in the radial direction. That is to say, parts of inner sides of the second feed blades 7b in the radial direction and a part of an outer side of the tubular net 21 in the radial direction overlap when viewed from the axial direction Da.

5 Pitches P1 of the first feed blades 7a are shorter than pitches of the second feed blades 7b. The pitches P1 of the first feed blades 7a are $1/3$ to $1/2$ of the pitches of the second feed blades 7b.

Although the feed blades 7 according to this embodiment have a continuous spiral shape (7a and 7b), the feed blades 7 may have an intermittent spiral shape.

10 [0043]

As shown in FIGS. 1 and 2, a pipe insertion hole 27 through which the introduction pipe 4 and the exhaust pipe 20 are inserted is formed in the end wall 19 of the rotating drum 3. A cylindrical flange 28 is formed in the pipe insertion hole 27 to protrude outward from the rotating drum 3. The flange 28 is formed such that a central
15 axis of the flange 28 coincides with the axis O of the rotating drum 3.

The seal mechanism 29 is provided between the flange 28 (the rotating drum 3) and the exhaust pipe 20. The seal mechanism 29 is constituted of a bush 34 formed of gunmetal (a copper alloy) and a seal member 35.

[0044]

20 A material forming the bush 34 is not limited to gunmetal and may be another metal or a plastic. For example, a gland packing or an oil seal packing can be adopted as the seal member 35. A simple seal mechanism can be used as the seal mechanism 29 as long as the simple seal mechanism can seal between the rotating drum 3 (the flange 28) which rotates and the exhaust pipe 20 which is fixed.

25 [0045]

The flange 28 is divided into a first flange 28a at the axial upstream side Da1 and a second flange 28b at the axial downstream side Da2. The seal mechanism 29 is provided between the first flange 28a and the exhaust pipe 20. The second flange 28b is integrally formed with the end wall 19.

5 The first flange 28a and the second flange 28b are connected using an annular flexible joint 36. The flexible joint 36 is a connector configured to connect annular members, which are formed of, for example, rubber with high pressure resistance. A material forming the flexible joint 36 is not limited to rubber, and a material with high pressure resistance and flexibility such as a metal hose and a fluororesin can also be
10 adopted as the material forming the flexible joint 36.

[0046]

 The air blower 2 is connected to the exhaust pipe 20 and suctions air in the internal space 6 of the rotating drum 3. The air blower 2 suctions the air in the internal space 6 of the rotating drum 3 so that a trash transport air flow is generated in the
15 transport pipe 13 and the introduction pipe 4.

 The transport pipe 13 is connected to a trash inlet port (not shown). That is to say, trash fed through the trash inlet port is introduced into the rotating drum 3 together with an air flow through the transport pipe 13 and the introduction pipe 4.

[0047]

20 An action of the storage and discharge device 1 according to this embodiment will be described below.

 First, trash fed through the inlet port is transported through the transport pipe 13 by an air flow generated using the air blower 2. That is to say, when the air blower 2 is operated, the air in the internal space 6 of the rotating drum 3 is suctioned through the
25 exhaust part 5 so that an air flow is generated in the transport pipe 13 provided on an

upstream side of the introduction pipe 4, and the trash (dust) and air are introduced into the rotating drum 3 through the introduction pipe 4 (which are illustrated as In in FIGS. 1 and 2).

[0048]

5 The trash introduced into the rotating drum 3 through the introduction pipe 4 falls into the rotating drum 3. The air introduced into the rotating drum 3 through the introduction pipe 4 flows into the exhaust pipe 20 through the ventilation holes 22 of the tubular net 21 and is suctioned into the air blower 2 (which is illustrated as Out in FIGS. 1 and 2).

10 The trash is transferred toward the discharge opening 8 using the feed blades 7. The discharge opening 8 includes a seal door (not shown) and is closed except when the trash is discharged. When the trash is discharged, an operation of the air blower 2 is stopped, and the seal door is closed. Thus, the trash is discharged through the discharge opening 8, and is sent to a trash collecting vehicle (not shown).

15 [0049]

 Also, the trash stored in the rotating drum 3 is transferred using the feed blades 7 while being repeatedly raised upward and falls downward along with rotation of the rotating drum 3, and is deposited such that the trash gradually becomes lower toward the axial upstream side Da1. That is to say, the stored trash is deposited to have a
20 predetermined angle of repose.

[0050]

 According to the above-described embodiment, the introduction pipe 4 serving as a pipe configured to suction trash and air into the rotating drum 3 and the exhaust pipe 20 configured to discharge the air have a cylindrical shape and are set to have a double
25 pipe structure so that the introduction pipe 4 and the exhaust pipe 20 can be reduced in

diameter, and the seal mechanism 29 between the exhaust pipe 20 and the rotating drum 3 can be further simplified.

The seal mechanism 29 may be adopted as long as sealing can be performed between the cylindrical exhaust pipe 20 and the flange 28 having a diameter sufficiently smaller than that of the rotating drum 3, and a general gland packing or an oil seal packing can be adopted as the seal mechanism 29. Furthermore, since a portion to be sealed is small, a high vacuum demand is also easily coped with.

[0051]

As shown in FIG. 5, the ventilation holes 22 are covered over the range A1 of the tapered part 26 so that, when trash M2 stored in the rotating drum 3 and raised upward when the rotating drum 3 rotates falls onto the tapered part 26, the trash falling on the tapered part 26 can be smoothly fallen downward. When no ventilation holes in the range A1 are blocked, the ventilation holes 22 of the tubular net 21 are blocked by the trash so that fluctuation such as an increase in flow rate of air generated due to a negative pressure source or the like occurs. However, this can be prevented according to this embodiment.

Also, the trash falling onto the tapered part 26 in the tubular net 21 can be smoothly fallen downward.

[0052]

The tapered part 26 is provided in the tubular net 21 so that a place in which the deposit M1 of the trash interferes with the tubular net 21 can be shifted to a place closer to the axial upstream side Da1. Thus, an amount of trash stored in the rotating drum 3 can be increased. That is to say, more trash can be stored in less space.

[0053]

The introduction pipe 4 protrudes further than the front end surface 25 of the

tubular net 21 so that the trash stored in the rotating drum 3 can be prevented from coming into contact with the tubular net 21 and damaging the tubular net 21.

[0054]

The ventilation holes 22 are covered over the range A2 of the front end surface
5 25 so that the flow rate of air generated using the negative pressure source can be prevented from varying from a predetermined value due to trash M3 accumulated on an upper surface of the introduction pipe 4 as shown in FIG. 5.

[0055]

The second feed blades 7b and the tubular net 21 are formed such that the
10 second feed blades 7b and the tubular net 21 overlap when viewed from the axial direction Da so that more trash can be blocked. Thus, an amount of trash stored in the rotating drum 3 can be increased.

[0056]

The flexible joint 36 is provided in the flange 28 in which the seal mechanism
15 29 configured to seal between the rotating drum 3 and the exhaust part 5 is provided so that, for example, even when the rotating drum 3 vibrates, the vibration can be prevented from reaching the seal mechanism 29. In other words, the flange 28 is divided, and the first flange 28a of the seal mechanism 29 side and the second flange 28b of the rotating drum 3 side are connected using the flexible joint 36 so that motion of the rotating drum
20 3 side can be absorbed using the flexible joint 36.

Since the introduction pipe 4 and the rotating drum 3 need not be precisely disposed to be coaxial with each other using the flexible joint 36 and can be disposed to be substantially coaxial with each other, that is, in a coaxial shape, installation thereof becomes easy.

25 [0057]

The pipe ventilation holes 33 are formed in the introduction pipe 4 so that some of introduced air can be sent to the exhaust part 5 through the pipe ventilation holes 33. Thus, wind speeds of the pipe ventilation holes 33 at the axial downstream side Da2 can be reduced. Thus, it is possible to prevent the ventilation holes 22 from being blocked by factors such as the trash deposit M1 rising.

[0058]

Although the embodiment of the present invention has been described in detail above, various modifications can be made without departing from the technical idea of the present invention.

10 For example, the tubular net 21 is not limited to a cylindrical shape and may have angular tubular shape (for example, an octagonal tubular shape).

The pipe ventilation holes 33 need not be necessarily provided.

[0059]

In the above-described storage and discharge device, it is possible to further simplify the seal mechanism between a fixed part such as the transport pipe and the rotating drum, and to prevent the ventilation holes of the filter from being blocked.

While preferred embodiments of the invention have been described and illustrated above, it should be understood that these are exemplary of the invention and are not to be considered as limiting. Additions, omissions, substitutions, and other modifications can be made without departing from the spirit or scope of the present invention. Accordingly, the invention is not to be considered as being limited by the foregoing description, and is only limited by the scope of the appended claims.

EXPLANATION OF REFERENCES

25 [0059]

	1 Storage and discharge device
	2 Air blower
	3 Rotating drum
	4 Introduction pipe
5	5 Exhaust part
	6 Internal space
	7 Feed blade
	7a First feed blade
	7b Second feed blade
10	8 Discharge opening
	9 Drive unit
	10 Electric motor
	11 Driving gear
	12 Driven gear
15	13 Transport pipe
	14 Receiving roller
	19 End wall
	20 Exhaust pipe
	21 Tubular net
20	22 Ventilation hole
	23 Rear end surface
	24 Cylindrical part (tubular part)
	25 Front end surface
	26 Tapered part
25	27 Pipe insertion hole

	28 Flange
	28a First flange
	28b Second flange
	29 Seal mechanism
5	31 Wire gauze
	32 Rib
	33 Pipe ventilation hole
	34 Bush
	35 Seal member
10	36 Flexible joint
	38 Metal plate (blocking part)
	39 Metal plate (second blocking part)
	Da Axial direction
	Da1 Axial upstream side
15	Da2 Axial downstream side
	O Axis
	T Conveyance direction

What is claimed is:

1. A storage and discharge device comprising:

5 a rotating drum having feed blades therein and configured to convey a subject to be processed to an axial downstream side when the rotating drum rotates about an axis;

an introduction pipe formed in a cylindrical shape coaxial with the axis, disposed from an axial upstream side to an axial downstream side of an end wall of the rotating drum at the axial upstream side, and configured to introduce a solid into the rotating drum together with air; and

10 an exhaust part through which an internal space of the rotating drum is connected to a negative pressure source,

wherein the exhaust part includes:

an exhaust pipe which is formed in a cylindrical shape coaxial with the axis at an outer side of the introduction pipe in a radial direction, which extends over an interior and exterior of the end wall, and in which an axial upstream side end portion thereof is connected to the negative pressure source;

a tubular net having a plurality of ventilation holes communicating with an internal space of the rotating drum, and provided in a portion of the exhaust pipe at the axial downstream side; and

20 a seal mechanism configured to seal between the exhaust pipe and the rotating drum, and

the tubular net includes:

a rear end surface protruding from an end portion of the exhaust pipe at the axial downstream side to an outer side thereof in the radial direction;

25 a tubular-shaped tubular part connected to an end portion of the outer side of the

rear end surface in the radial direction;

a front end surface protruding from a portion near an end portion of the introduction pipe at the axial downstream side to an outer side thereof in the radial direction;

5 a tapered part configured to connect an end portion of the tubular part at the axial downstream side and an end portion of the outer side of the front end surface in the radial direction and gradually narrowed to the axial downstream side; and

a blocking part configured to block the tapered part from a range of 180° to 270° with respect to a lower end of the tapered part in a rotational direction of the

10 rotating drum when viewed from the axial downstream side.

2. The storage and discharge device according to claim 1, wherein the introduction pipe protrudes from the front end surface to the axial downstream side.

15 3. The storage and discharge device according to claim 1 or 2, comprising:

a second blocking part configured to block the front end surface in a range of at least $\pm 45^\circ$ with respect to an upper end of the front end surface in a circumferential direction of the axis.

20 4. The storage and discharge device according to any one of claims 1 to 3, wherein the feed blades include first feed blades disposed in a range in which the introduction pipe extends and second feed blades disposed at the axial downstream side of the first feed blades, and

the second feed blades are disposed such that part of the second feed blades and
25 part of the tubular net overlap when viewed from the axial direction.

5. The storage and discharge device according to any one of claims 1 to 4, wherein the rotating drum includes a pipe insertion hole which is formed in the end wall and in which the exhaust pipe is disposed, a first flange, a second flange, and a flexible joint,

5 the second flange is integrally formed with the end wall at the pipe insertion hole, and

sealing is performed between the first flange and the exhaust pipe using the seal mechanism, and the first flange and the second flange are connected to each other using the flexible joint.