Research Report

(Yufeng Hui)

20240405

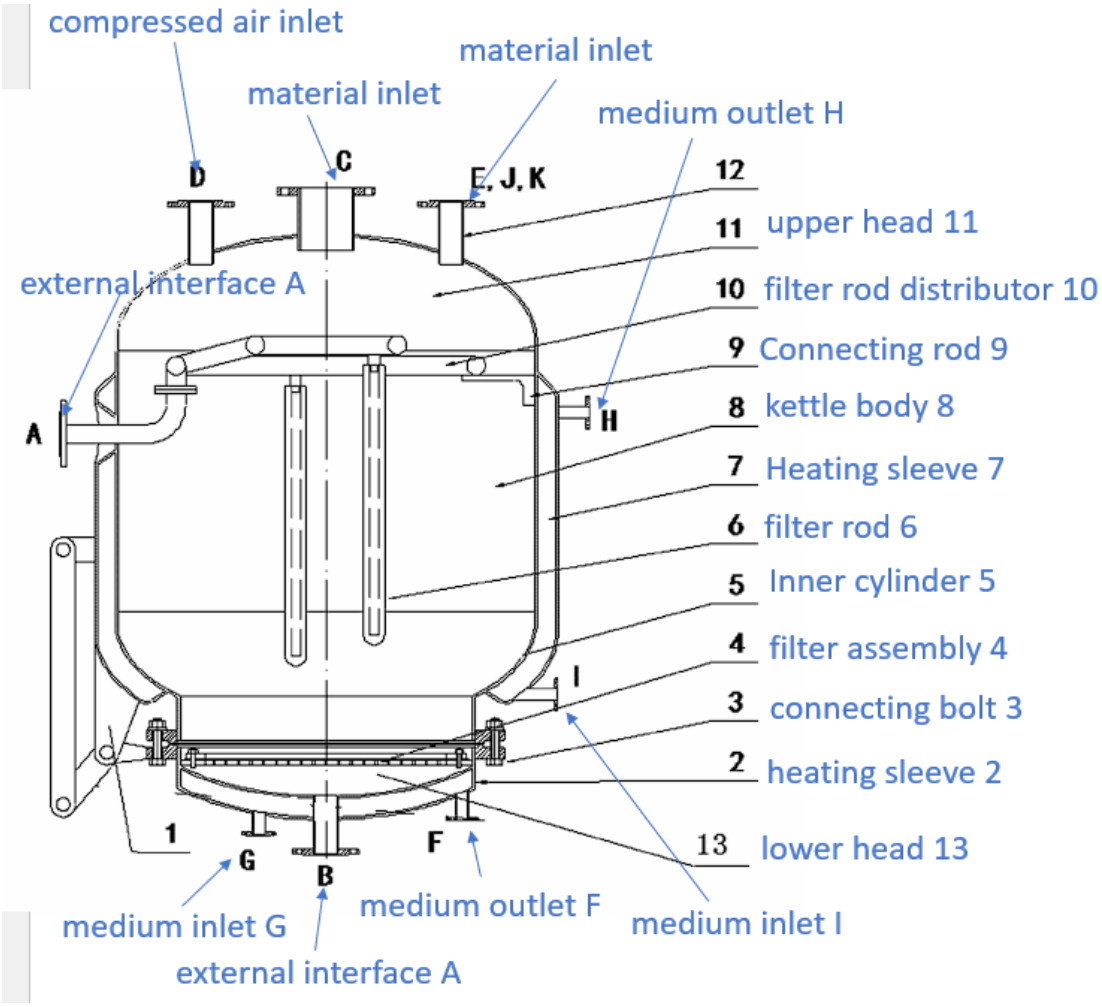
In these two days, I completed the search of all the patents related to the device of Synose. I have retrieved a total of 12 patents, of which 10 are patents for devices helpful to the production of sucrose esters. Finally, I summarized these 10 patents.
In the coming week (before April 12), I plan to complete the search for patents related to Gaotong and Adana. In addition, I will sort out and summarize the patents of processes and devices related to the production of sucrose esters.

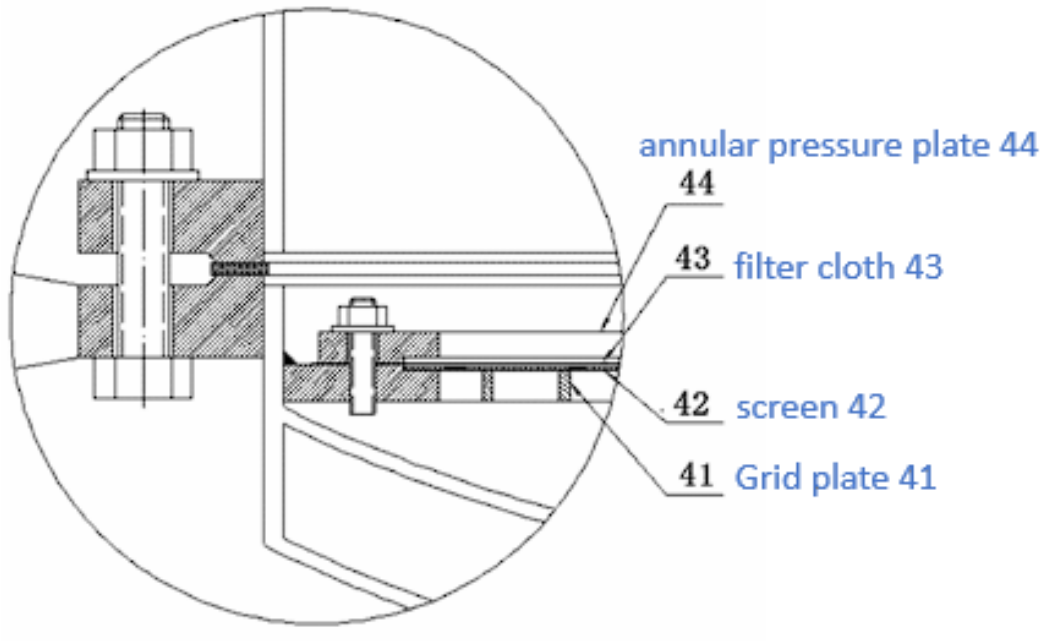
Synose1 Filtration, washing and drying device

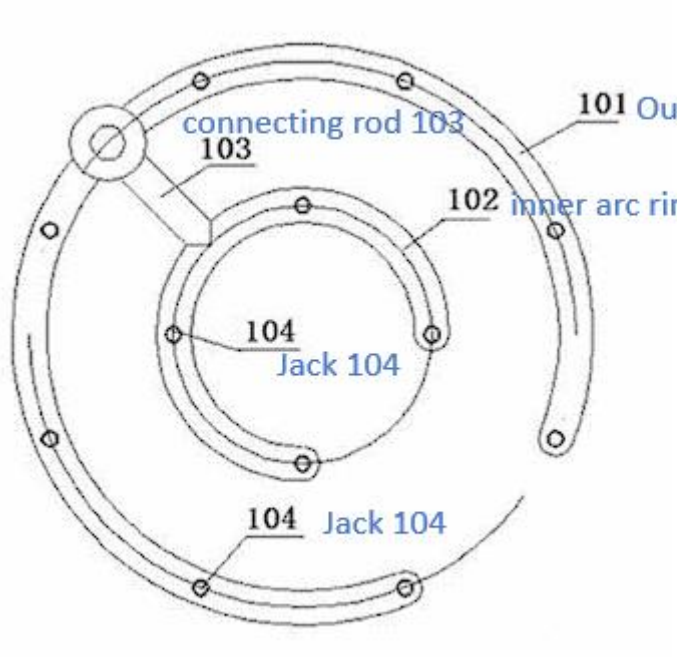
(CN 202179894 U)

The device can complete filtration, washing and drying operation respectively, simplify unit operation, save energy consumption, reduce solvent consumption and material loss, reduce pollution and reduce investment. It is suitable for filtration, washing and drying equipment containing toxic, flammable and explosive solvents.

The filter, washing and drying device comprises a kettle body composed of an inner cylinder, an upper head and a lower head, wherein a detachable filter assembly is arranged on the lower head, and a filter rod distributor is fixed in the kettle body. at least one filter rod is arranged on the filter rod distributor; the upper head is provided with a plurality of material inlets allowing materials to enter the kettle, and the material inlet includes at least one compressed gas inlet. The barrel of the kettle body is provided with a first external interface for connecting the filter rod with the outside world, and the lower head is provided with a second external interface for connecting the filter plate assembly. The utility model has the advantages that filtering, washing and drying operations can be completed respectively in the same device, simplifies unit operation, saves energy consumption, reduces solvent consumption and material loss, reduces pollution and can reduce investment, and is suitable for situations containing toxic, flammable and explosive solvents.


compressed air inlet
material inlet
material inlet
medium outlet H
D
C
E, J, K
12
11 upper head 11
external interface A
10 filter rod distributor 10
9 Connecting rod 9
A
H
8 kettle body 8
7 Heating sleeve 7
6 filter rod 6
5 Inner cylinder 5
4 filter assembly 4
I
3 connecting bolt 3
2 heating sleeve 2
1
G
B
F
13 lower head 13
medium inlet G
medium outlet F
medium inlet I
external interface A


annular pressure plate 44
44
43 filter cloth 43
42 screen 42
41 Grid plate 41

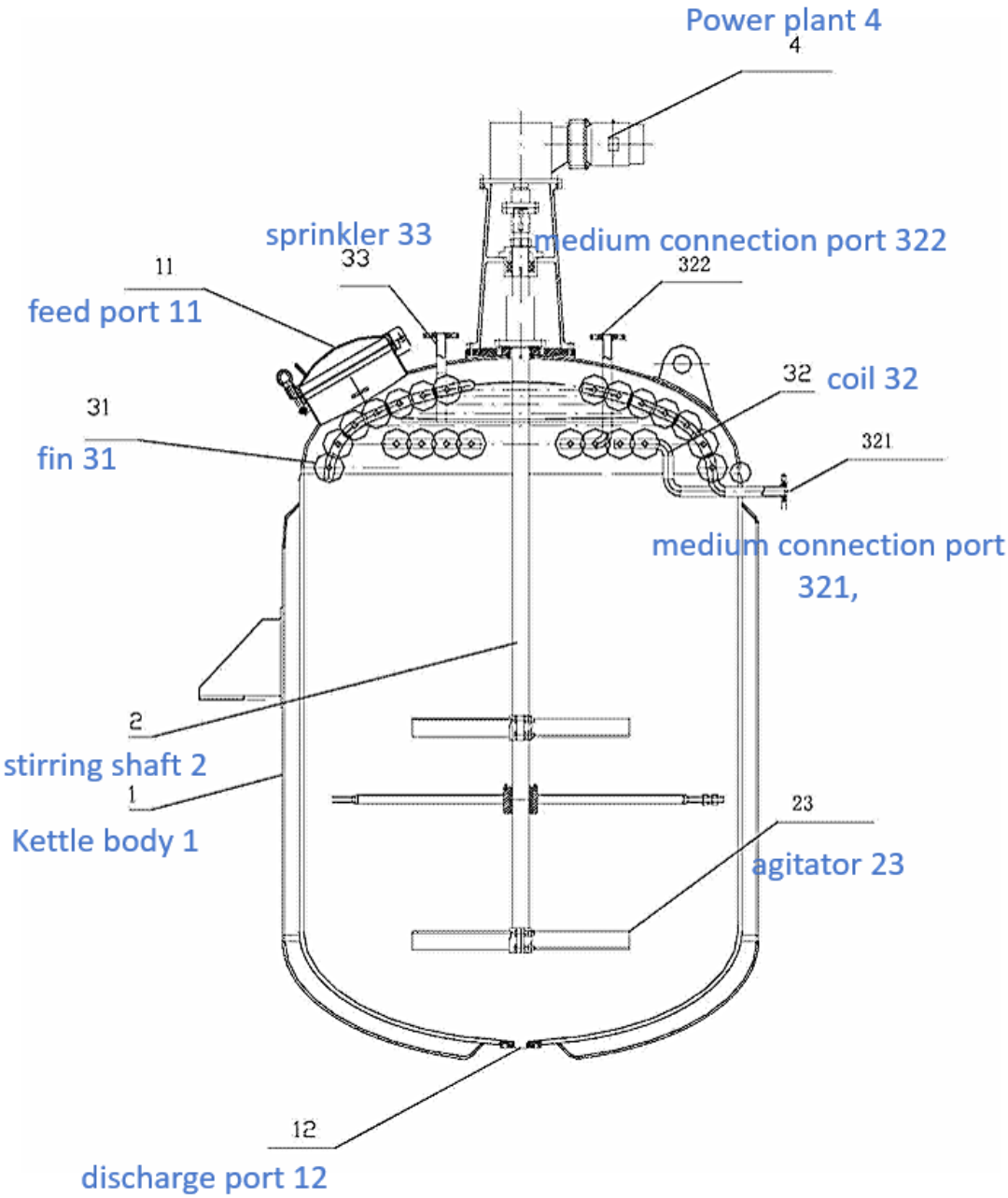

101
Outer arc ring 101
connecting rod 103
103
102
inner arc ring 102
104
Jack 104
104
Jack 104

Synose3 A reaction kettle suitable for sublimation material

(CN 219540620 U)

In the actual production of chemical industry, some reaction materials will be sublimated at the top of the reaction kettle during the reaction process, and this part of the material can not participate in the reaction, resulting in unstable material ratio and slow reaction speed, increasing energy consumption and production cost. After the end of the synthetic reaction, we want to collect the excess unreacted raw materials, but it is very easy to cause pipeline blockage and lead to recovery failure, and it is extremely difficult for the easy sublimation materials to gather in the top of the reactor, distillation lines and condensers for a long time to clean and recycle. At the same time, due to long-term accumulation, there are security risks, there are many situations in this process, affecting production capacity. Therefore, it is an urgent problem to avoid this kind of situation and collect materials and apply them to later batches as much as possible.

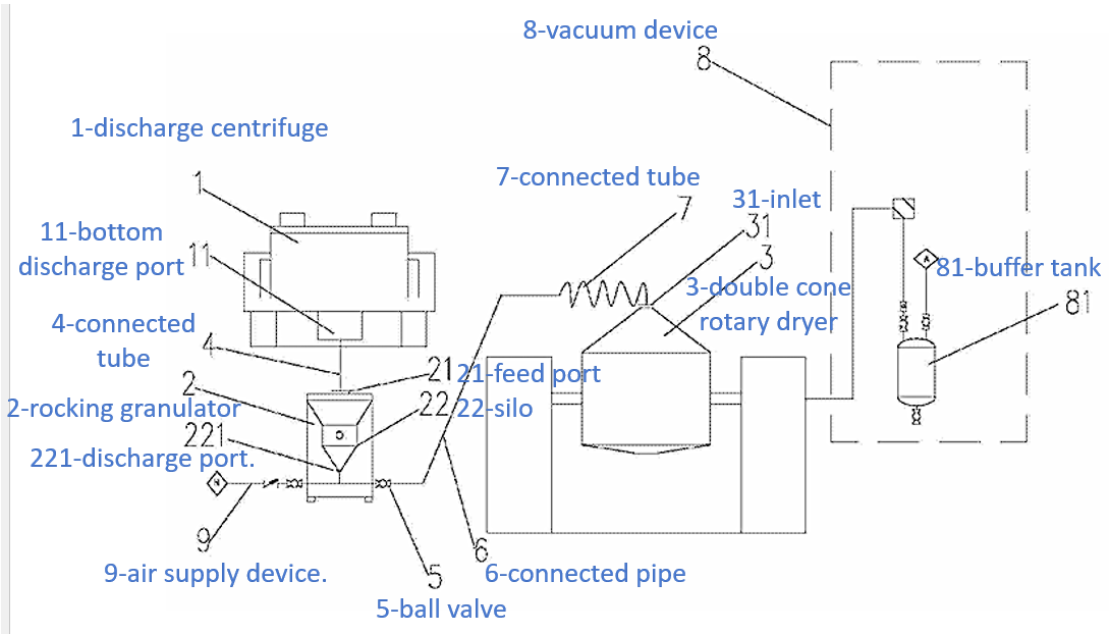
The reaction kettle is suitable for a reaction kettle containing sublimated materials, comprising a kettle body and a stirring shaft arranged in the kettle body. The kettle body is provided with a reaction chamber for the material to react. The kettle body is provided with a feed inlet and a material outlet which are connected with the reaction chamber. The reaction chamber of the kettle body is provided with a sublimation material recovery device, and the sublimation material recovery device comprises a plurality of fins, coils and sprinklers, and the fins are arranged on the top of the reaction chamber. The fins are connected by a coil. The coil has an interoperable medium inlet and a medium outlet, which are located outside the kettle body, and the medium inlet is connected with a cold source or a heat source. The sprinkler is arranged on the top of the kettle body. The liquid inlet of the sprinkler is connected with the reaction liquid, and the spray port of the sprinkler is aligned with the fin. The reaction kettle has the advantages of simple structure, cheap and easy to obtain, effectively collects the materials at the top of the reaction kettle, and improves the yield and raw material utilization rate.


Power plant 4
4
sprinkler 33
33
medium connection port 322
322
11
feed port 11
32
coil 32
31
fin 31
321
medium connection port
321,
2
stirring shaft 2
1
Kettle body 1
23
agitator 23
12
discharge port 12

Synose4 A closed transfer device containing organic solvent material (CN 219647474 U)

The unloading centrifuge is mainly suitable for the separation of suspensions containing fine and medium particle sizes, especially for the separation of high viscosity, fine particle size, toxic and flammable materials, so it is widely used in chemical, pharmaceutical, environmental protection and other industries. After the discharge of the unloading centrifuge, the material is usually transported to the next link by belt conveyor or manual handling for drying operation, but it is very easy to produce dust in the blanking process, and there are more or less solvent residues in the filter cake. the volatilization of organic solvent gas is also easy to cause personnel poisoning and environmental pollution and the formation of gas explosive mixture in the airtight space, resulting in serious safety risks and other problems. In addition, the quality of the material after centrifugation is heavier, the working environment is poor, and the labor intensity is high.

The device is a closed material transfer device containing organic solvent materials, including a sequentially connected discharge centrifuge, a pendulum granulator and a double-cone rotary dryer. The top of the rocking granule machine is provided with a feed port and the bottom is provided with a material bin. The bottom of the silo is provided with a discharge outlet. The feed port is connected with the bottom discharge pipe of the lower discharge centrifuge. The material outlet is connected with the inlet pipeline of the double-cone rotary dryer. The advantages of the device are as follows: the leakage of organic solvents is effectively avoided, the degree of automation and safety are improved; the quality of the material is reduced after centrifugation, and it is convenient for transportation, and there is no dust leakage in the process of transportation. the physical harm to the operators and the pollution to the environment are reduced.

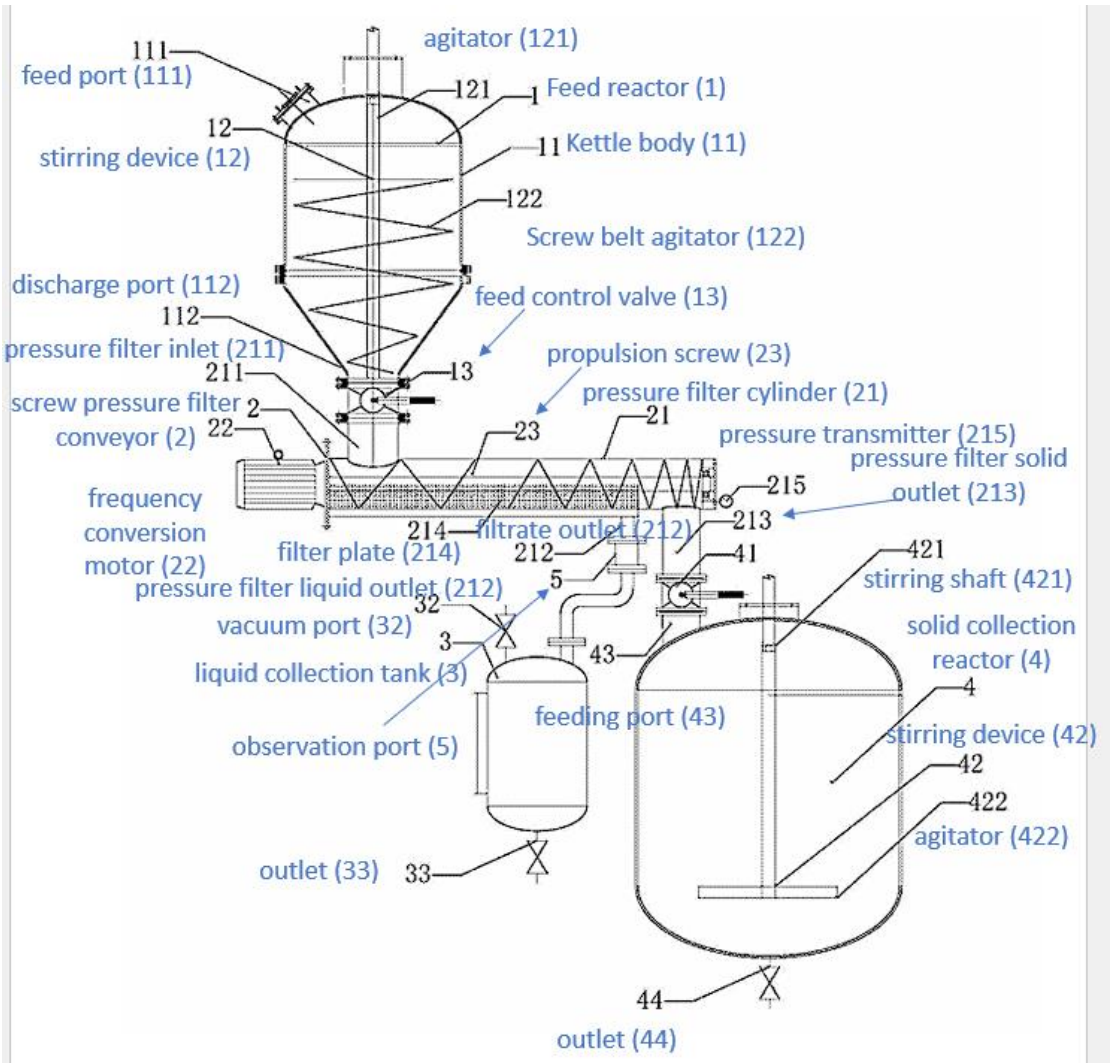

8-vacuum device
1-discharge centrifuge
7-connected tube
31-inlet
11-bottom discharge port
3-double cone rotary dryer
81-buffer tank
4-connected tube
21-feed port
2-rocking granulator
22-silo
221-discharge port.
9-air supply device.
6-connected pipe
5-ball valve

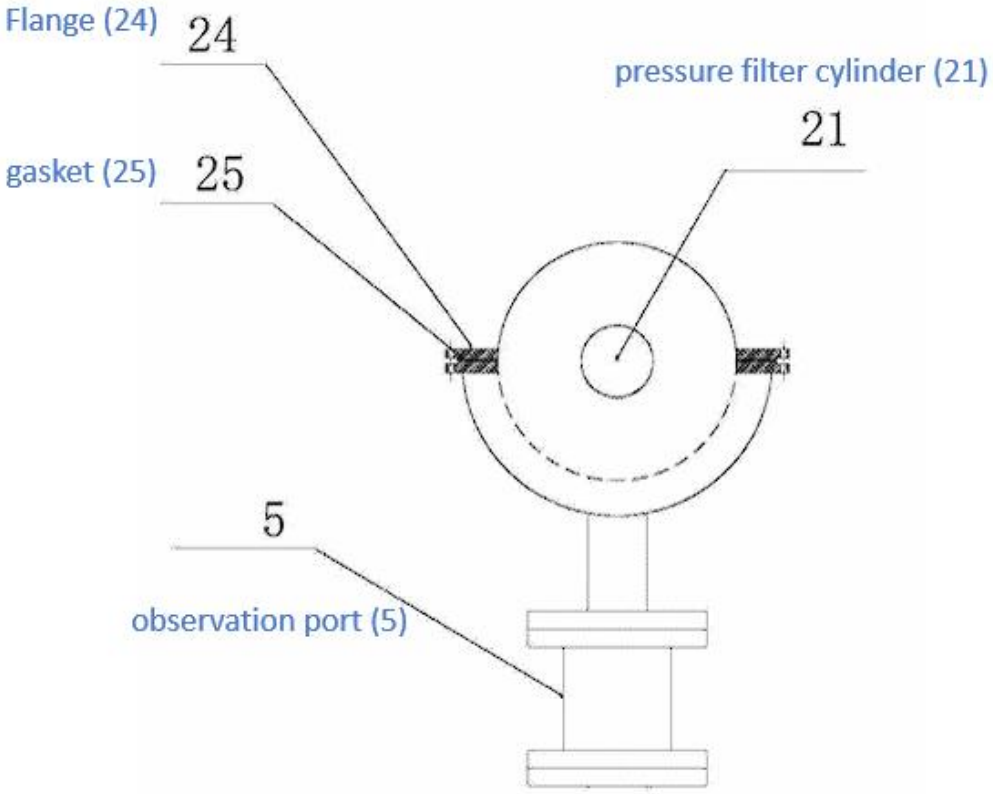
Synose5 A closed pressure filtration conveying device suitable for viscous materials

(CN 219688748 U)

Solid-liquid separation of materials is often involved in fine chemicals, pharmaceuticals and other fields. Usually, drum centrifuge, settling centrifuge, bag filter, three-in-one filter and other devices can be used to realize solid-liquid separation operation. But for viscous materials, it is easy to cause the drum centrifuge filter bag to be bonded and block the liquid filter channel; the settling centrifuge separation power is insufficient and the effect is not good; the same effect is not good when using cloth bag centrifuge and three-in-one filter. The analysis of the reason, on the one hand, is that the solid material has a certain viscosity and is easy to deform, which makes it drill into the pore diameter of the filter media and block the pipeline; on the other hand, the filtration power is insufficient to provide enough force to separate the solid from the liquid.

The device is a closed pressure filtration conveying device suitable for viscous materials, which comprises a feed reaction kettle, a screw pressure filter conveyor, a liquid collection tank and a solid collection reactor; the feed reaction kettle comprises a kettle body and a first stirring device The screw filter press conveyor is arranged under the feed reaction kettle, which includes a pressure filter cylinder body, a frequency conversion motor and a propulsion screw, and an internal conveying chamber of the pressure filter cylinder body. The front end of the pressure filter cylinder body is provided with a pressure filter inlet, the end is provided with a pressure filter liquid outlet and a pressure filter solid outlet, and the pressure filter inlet is connected with the outlet pipe. A filter plate is arranged in the lower part of the conveying chamber, one end of the filter plate is connected to the inner cylinder wall of the pressure filter cylinder body close to the pressure filter inlet, and the other end is connected to the inner tube wall of the pressure filter cylinder body at the pressure filter liquid outlet; the liquid collection tank is connected with the pressure filtration liquid outlet pipeline; the solid collection reaction kettle is connected with the pressure filter solid outlet pipe. The advantages of the device: it can effectively prevent pipeline blockage, facilitate cleaning, and enhance the effect of solid-liquid separation.


111
feed port (111)
agitator (121)
121
1
Feed reactor (1)
12
stirring device (12)
11
Kettle body (11)
122
Screw belt agitator (122)
discharge port (112)
feed control valve (13)
112
pressure filter inlet (211)
propulsion screw (23)
211
13
pressure filter cylinder (21)
screw pressure filter
conveyor (2)
2
22
23
21
pressure transmitter (215)
pressure filter solid
outlet (213)
215
frequency
conversion
motor (22)
214
filtrate outlet (212)
213
filter plate (214)
212
41
421
stirring shaft (421)
5
pressure filter liquid outlet (212)
32
vacuum port (32)
solid collection
reactor (4)
3
43
liquid collection tank (3)
4
feeding port (43)
stirring device (42)
observation port (5)
42
422
agitator (422)
outlet (33)
33
44
outlet (44)

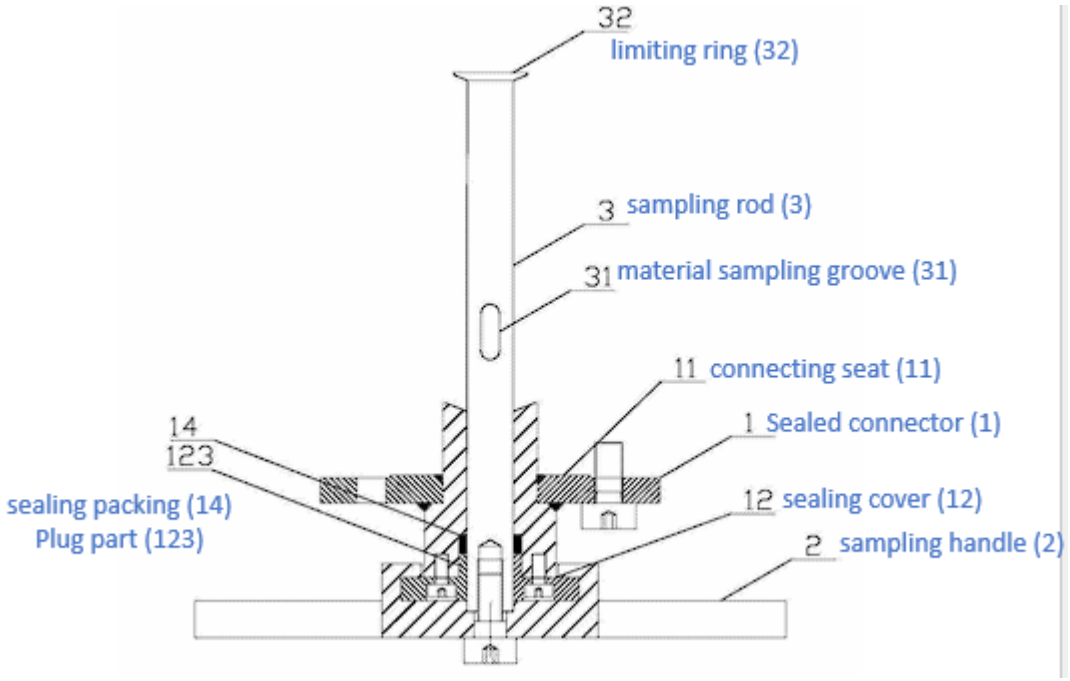

Flange (24)
24
pressure filter cylinder (21)
21
gasket (25)
25
5
observation port (5)

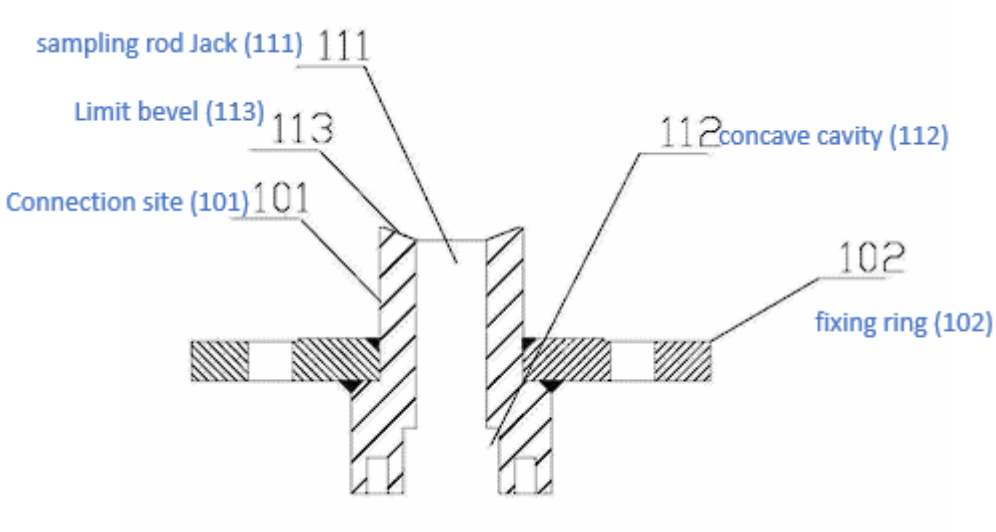
Synose6 A sampler for vacuum reaction system

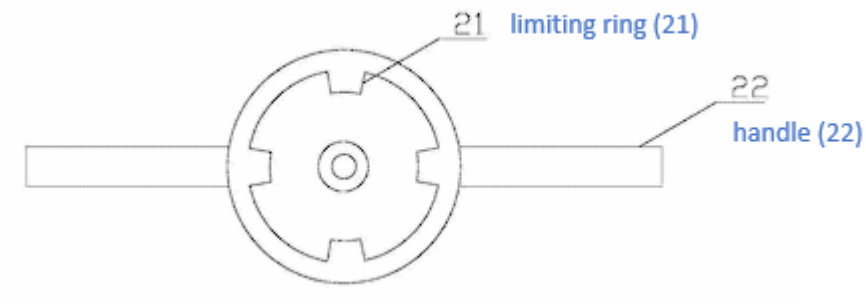
(CN 219957009 U)

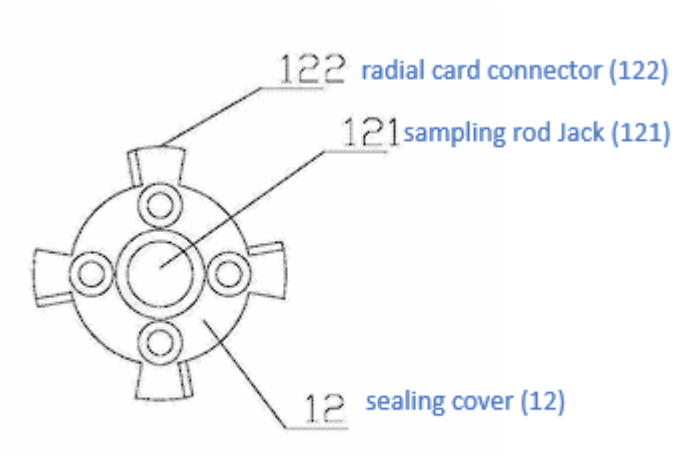
In the field of synthesis and processing of polymer compounds or polymer materials, it is necessary to monitor the production process of high viscosity materials. however, in the existing technology, when high viscosity materials such as sucrose fatty acid esters need to be sampled and tested, it is difficult to keep the reaction kettle closed, destroy the vacuum, and the adverse reaction is carried out, and it is easy to expose the materials to air, contact oxidation and moisture absorption, resulting in poor color of the reaction materials. Catalyst destruction and so on.

The utility model relates to a sampler for a vacuum reaction system, which comprises a sealed connector, a sampling handle and a sampling rod; the sealed connector comprises a connecting seat and a sealing cover, and the connecting seat is arranged at the side wall of the head at the bottom of the reactor; the center of the connecting seat is provided with an axial through first sampling rod Jack, and the rear part of the first sampling rod Jack is expanded to form a concave cavity; the sealing cover is arranged at the back end of the connecting seat. The center of the sealing cover is provided with a second sampling rod Jack, and the second sampling rod Jack is coaxially arranged with the first sampling rod Jack; the front part of the sampling rod is arranged in the reactor, and the rear end part of the sampling rod successively passes through the first sampling rod Jack, the second sampling rod Jack is connected with the sampling handle, and the sampling rod, the sealing cover and the connecting seat are surrounded to form a sealing chamber; the sampling rod is provided with a material sampling groove; the sampling handle is removably connected with the sealing cover. The advantage of the device is that the viscous material is sampled without destroying the vacuum, and the phenomena of oxidation decomposition, moisture absorption and so on are avoided when the reaction material comes into contact with air.


32
limiting ring (32)
3 sampling rod (3)
31 material sampling groove (31)
11 connecting seat (11)
1 Sealed connector (1)
14
123
sealing packing (14)
Plug part (123)
12 sealing cover (12)
2 sampling handle (2)


sampling rod Jack (111)
111
Limit bevel (113)
113
112 concave cavity (112)
Connection site (101)
101
102
fixing ring (102)


21 limiting ring (21)
22
handle (22)

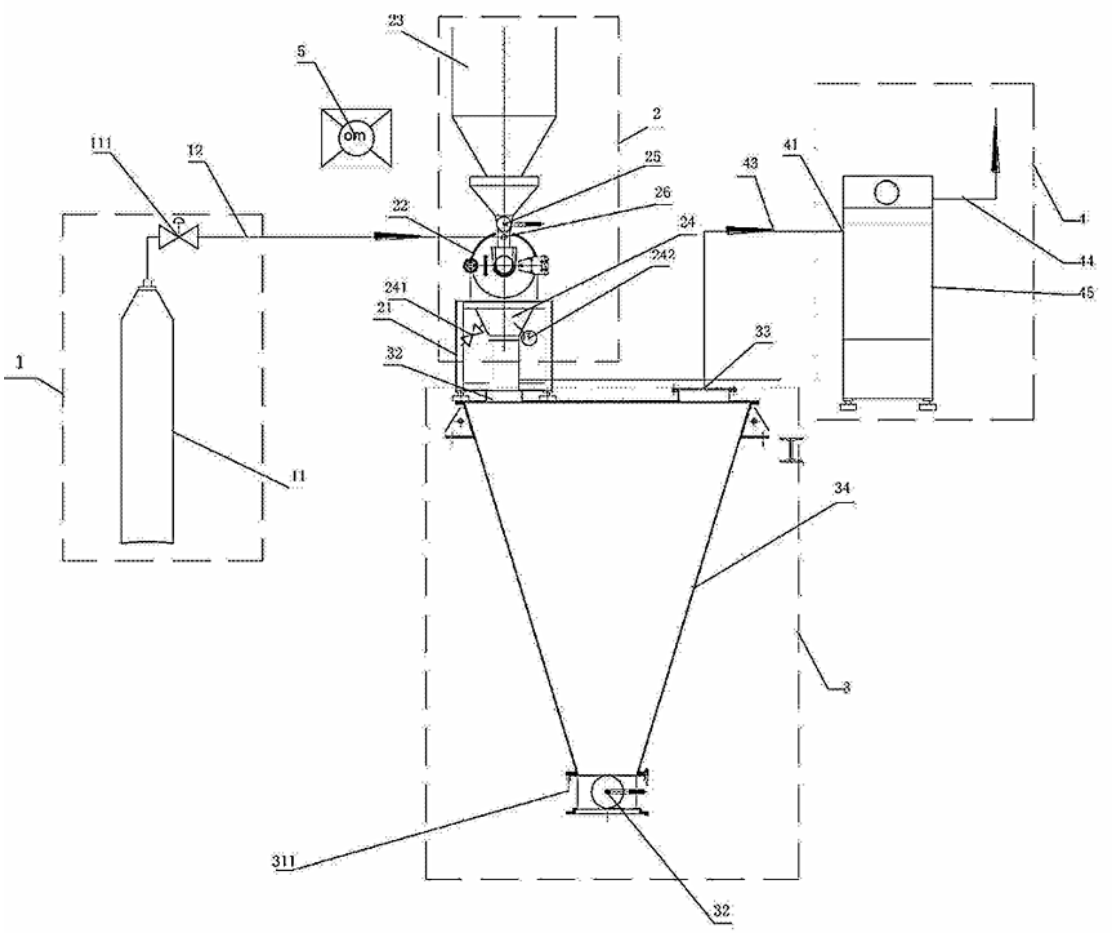

122
radial card connector (122)
121
sampling rod Jack (121)
12
sealing cover (12)

Synose7 A pulverizer with forced cooling function

(CN 219559726 U)

in fine chemicals, pharmaceuticals and other fields, materials are often crushed and crushed. Conventional materials can be crushed by conventional crushing equipment such as universal grinder, airflow grinder, hammer grinder, ultra-fine grinder and so on. According to the particle size, the crusher can be divided into coarse crusher, crusher and ultra-fine grinder. There are four kinds of external forces applied to solids in the process of grinding: shearing, impact, rolling and grinding. Shearing is mainly used in coarse crushing and crushing operations suitable for crushing or crushing of ductile or fibrous materials and bulk materials. impact is mainly used in crushing operations suitable for brittle materials, mainly used in high-fineness crushing and ultra-fine grinding operations, materials of most properties are mainly used for ultra-fine grinding or ultra-large grinding equipment for further grinding operations after crushing operations. The actual crushing process is often several external forces acting at the same time. However, some materials can not be crushed well because of their low melting point, reduced brittleness in the grinding process and instability under heating conditions. Due to the high-speed collision between materials and equipment, materials and materials in the process of grinding, the temperature of materials and equipment increases, resulting in melting, adhesion, large particles and uneven particles, and the ideal grinding results can not be obtained.

The device is a pulverizer with forced cooling function, which includes a cooling device, a pulverizer, a silo and an exhaust dedusting device. The pulverizer comprises a frame and a grinder arranged on the rack. The top feed port of the grinder is connected with the feed bin and the bottom outlet is connected with the bin. The top feed port of the crusher is provided with a feed control valve and a cooling medium inlet, wherein the cooling medium inlet is connected with the cooling device pipeline. The silo is arranged under the pulverizer, the bottom of the silo is provided with a material outlet, the top of the silo is provided with a feed port and an air extraction port, and the feed port is connected with the discharge bin pipeline of the pulverizer. The exhaust port is connected with the pipeline of the exhaust dedusting device. The advantage of the device is that the heat generated in the crushing process of the material with lower melting point can be removed in time, ensuring that the temperature of the material is lower than the melting point, keeping brittleness and easy grinding, and achieving the target particle size.



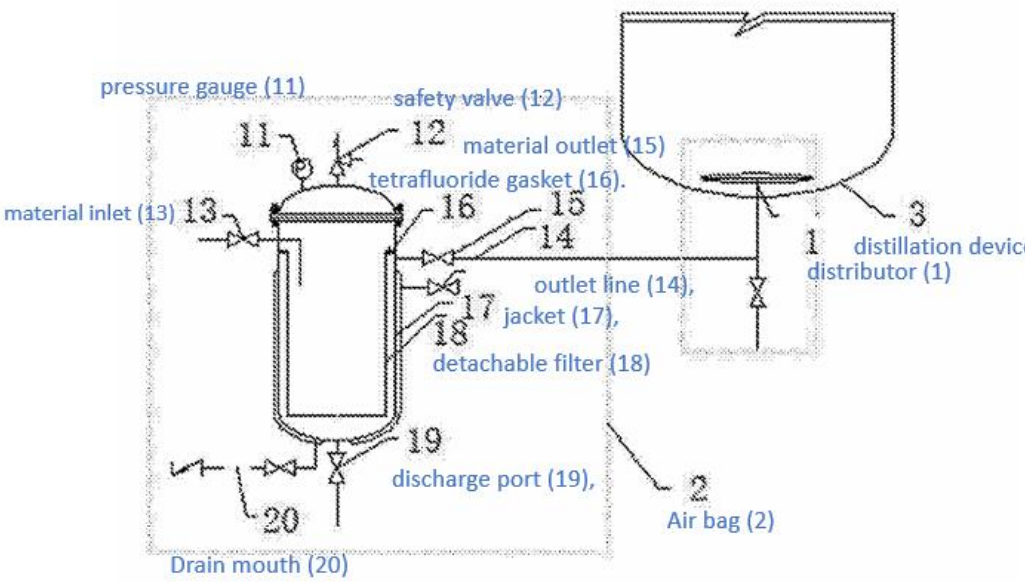
Cooling device (1), pulverizer (2), silo (3), exhaust dedusting device (4), frame (21), crushing mechanism (22), feed bin (23), discharge bin (24), feed control valve (25), coolant inlet (26), silo body (34), discharge port (31), feed port (32), exhaust port (33), liquid nitrogen tank (11), cooling medium connection pipe (12) Liquid nitrogen pressure reducing control valve (111), liquid nitrogen pressure reducing regulating valve (111), exhaust dedusting device (4) includes dust removal mechanism body (45), air inlet (41), exhaust port (42), intake pipe (43), exhaust pipe (44), oxygen content detection alarm (5)

Synose8 Residual solvent removal device

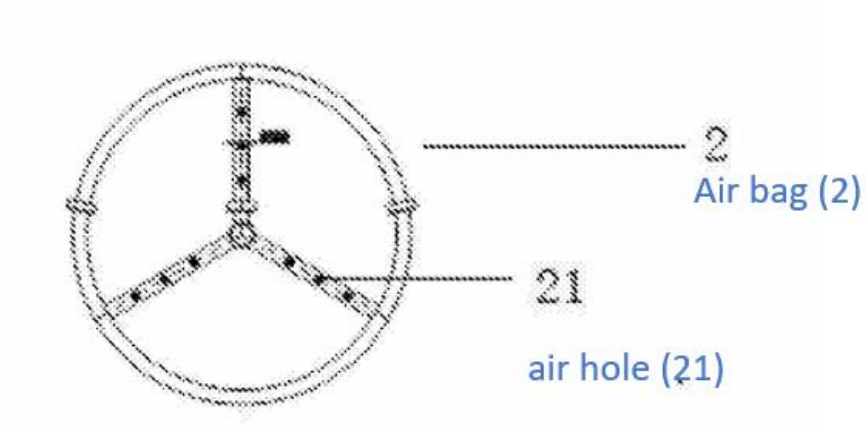
(CN 219646729 U)

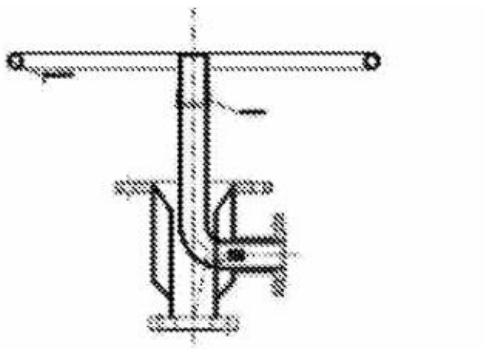
In fine chemicals, pharmaceuticals and other fields, solvent switching is often needed in the reaction and post-treatment process. the residue of the last solvent will not only cause cross-contamination of the solvent system, but also sometimes lead to the failure of subsequent reactions, post-treatment and other processes. In addition, for liquid products, it also involves the control of solvent residues in the final products, which is often at the PPM level, and conventional distillation equipment usually can not meet the process requirements, so steam distillation units can be used. At present, the conventional steam distillation equipment usually passes the steam pipeline into the distillation kettle to let the steam come into contact with the material, thus bringing out the desired distillation components to achieve the purpose of water vapor distillation. The use of steam distillation device effectively increases the mixing effect of steam and materials, and improves the distillation effect, but there is a lack of flow control device; in addition, the steam system inevitably contains a small amount of foreign body, if the foreign body into the product can not be tolerated.

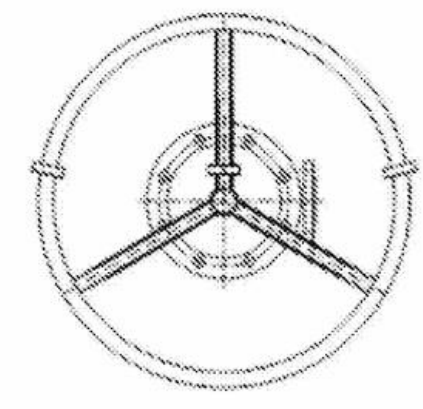
The device is a residual solvent removal device, comprising a gas bag and a distributor, wherein the air bag is connected with the distributor through a pressure pipeline, the distributor is arranged at the bottom of the inner cavity of the distillation device, and the distributor is provided with pores. The opening direction of the pores is directed toward the bottom or side of the distillation device; the air bag includes a cylinder body, and the upper end of the cylinder body is provided with an upper head. A pressure gauge and a safety valve for monitoring the gas pressure in the cylinder body are arranged on the upper head; at least one material inlet allowing steam or gas to enter the cylinder body and the material outlet allowing steam or gas to leave the cylinder body are arranged on the cylinder body, the opening position of the material inlet is higher than the opening position of the material outlet, and the material inlet and the material outlet are respectively connected with the inlet pipeline and the outlet pipeline. The device is suitable for vacuum or atmospheric distillation system. After most of the solvents are evaporated, the residual solvent in the material can be further removed by using the utility model to inject nitrogen or water vapor.


pressure gauge (11)
safety valve (12)
material outlet (15)
tetrafluoride gasket (16).
material inlet (13)
distillation device (3)
distributor (1)
outlet line (14),
jacket (17),
detachable filter (18)
discharge port (19),
Air bag (2)
Drain mouth (20)

Schematic diagram of three different forms of gas distributor





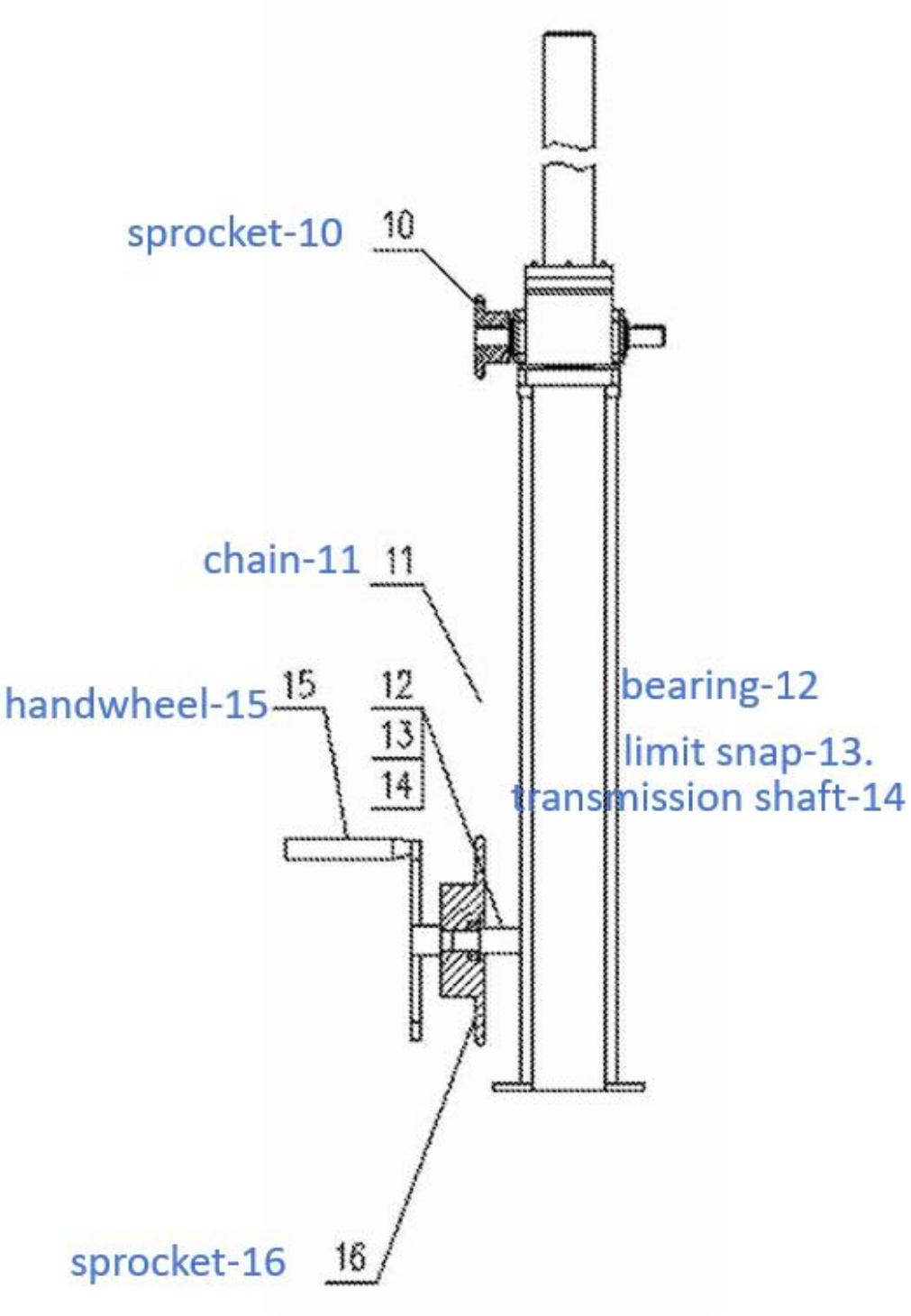


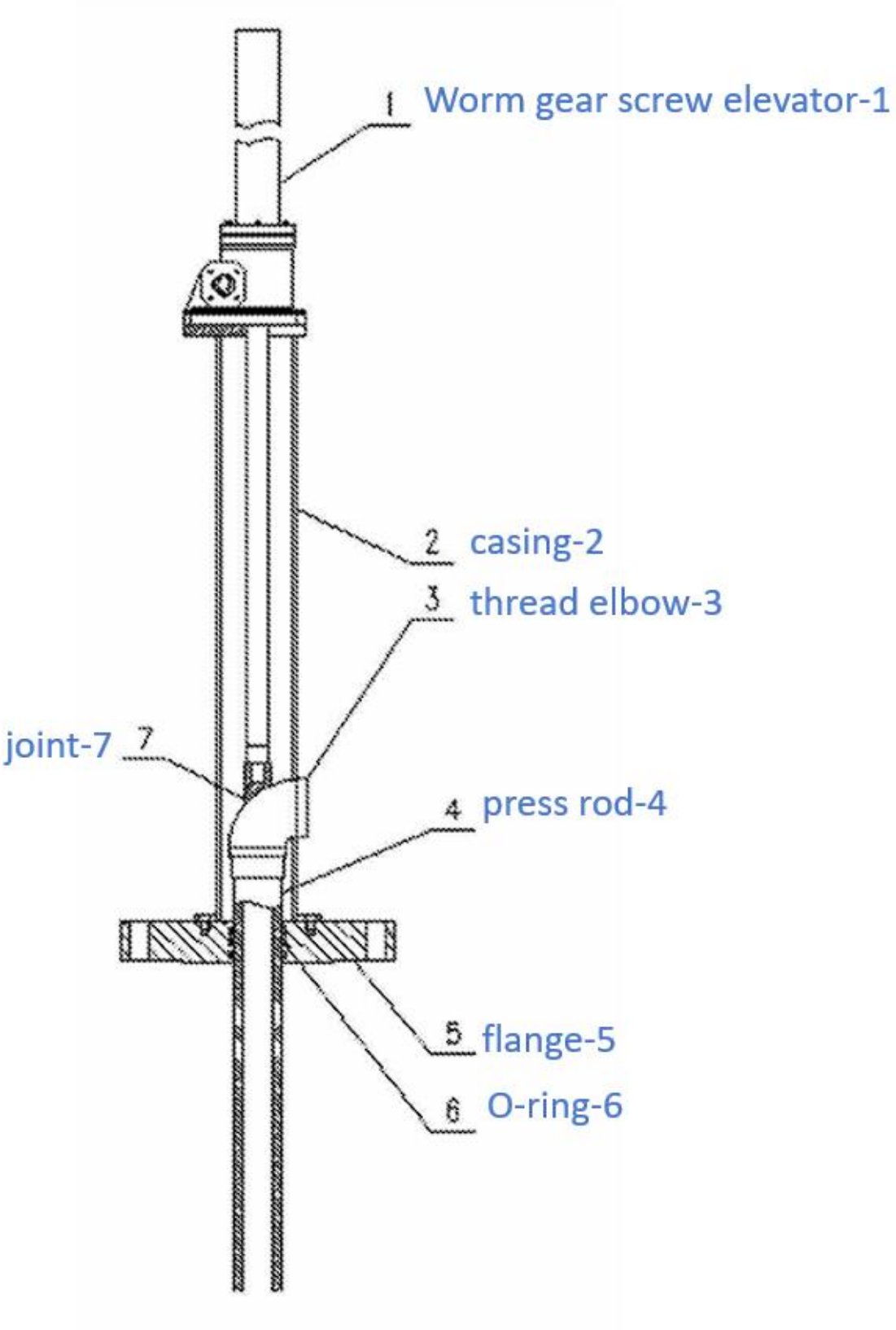
Synose9 Supernatant hydraulic pressure device

(CN 220548736 U)

In the actual production of chemical industry, the slurry washing process needs to be adopted because of the production process. After slurry washing, the supernatant is separated by static layering. At present, the supernatant is often separated by absorbing the supernatant in vacuum, which has great safety and technological risks and is not advisable. In order to improve the operation and realize the safe, rapid and efficient separation of the supernatant, it is necessary to adopt a suitable device to solve the safety problems existing in vacuum absorption of the supernatant.

The device is a supernatant hydraulic material pressing device, which comprises a material pressing rod, a worm wheel screw elevator, a handwheel assembly, a chain and a flange piece, and the material pressing rod is fixed on the reaction kettle body or tank body through the flange sheet. The screw of the worm gear screw elevator is connected with the pressing rod, and the worm wheel of the worm gear screw elevator is provided with a transmission rod, and a sprocket is arranged on the transmission rod. The handwheel assembly includes a handwheel, a transmission shaft and a sprocket. The sprocket is arranged on the transmission shaft, and the handwheel is rotated and connected with one end of the transmission shaft. The two ends of the chain are respectively arranged on two sprockets. Turning the handwheel drives the screw of the worm gear screw elevator to move up and down through the chain, so as to adjust the height of the pressing rod and the supernatant liquid level. The device is simple, cheap and easy to obtain, can effectively and quickly transfer materials, increase the production capacity and eliminate the hidden dangers of safety.


sprocket-10
10
chain-11
11
handwheel-15
15
12
13
14
bearing-12
limit snap-13.
transmission shaft-14
sprocket-16
16

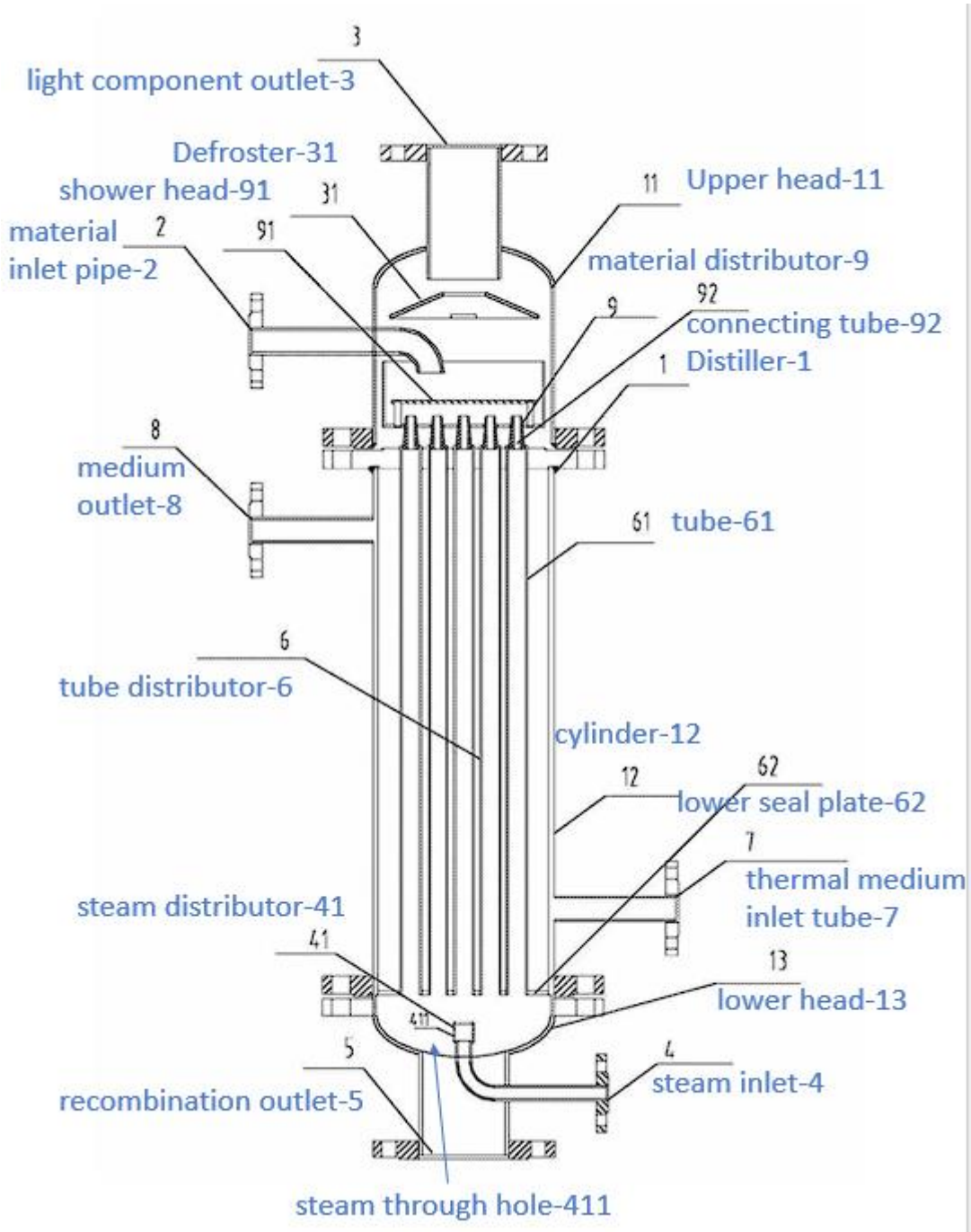

1 Worm gear screw elevator-1
2 casing-2
3 thread elbow-3
joint-7 7
4 press rod-4
5 flange-5
6 O-ring-6

Synose12 Water vapor distillation equipment

(CN 208229413 U)

Water vapor distillation is an important method for the separation and purification of compounds. It is widely used in the fields of fine chemicals, oil processing, pharmaceuticals and traditional Chinese medicine, such as recovering solvents, recovering excess raw materials for reaction, purifying high boiling point substances and removing trace high boiling impurities. At present, the conventional steam distillation is usually to put the steam pipeline into the distiller and let the steam come into contact with the material, so as to bring out the components to be distilled and achieve the purpose of steam distillation. Although there is no steam distributor, the effect of directly passing the steam pipeline into the material is increased, but the steam and material are not fully mixed and the distillation efficiency is low. In addition, the materials in the distiller are exposed to high-temperature steam for a long time, which can easily lead to the decomposition of thermosensitive and hydrolysable compounds such as esters, ethers and amides, resulting in the formation of impurities.

The device is a water vapor distillation equipment, which includes a distiller, and the middle part of the distiller is provided with a distillation area for distilling materials. The upper part of the distiller is provided with at least one material inlet pipe for introducing the material into the distillation area and at least one light component outlet for discharging the light component from the material. The lower part of the distiller is provided with a steam inlet for entering steam into the distillation area and at least one recombination outlet for discharging the recombination fraction in the material, and the distillation area is equipped with a tube distributor for conveying the material from the material inlet to the distillation area, and the distillation area is provided with a heat medium inlet pipe for heating the material in the conveying pipeline system and a medium outlet for discharging the medium after heat exchange. The advantages of the device: according to the properties of the material, the material can be preheated to improve the distillation effect. In addition, the effect of water vapor distillation can be optimized by adjusting the feed speed and changing the thickness of material film. For materials with high boiling point, vacuum distillation can be used to improve the distillation effect.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light component outlet-3
Defroster-31
shower head-91
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11 Upper head-11
material
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1 Distiller-1
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medium
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steam distributor-41
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13
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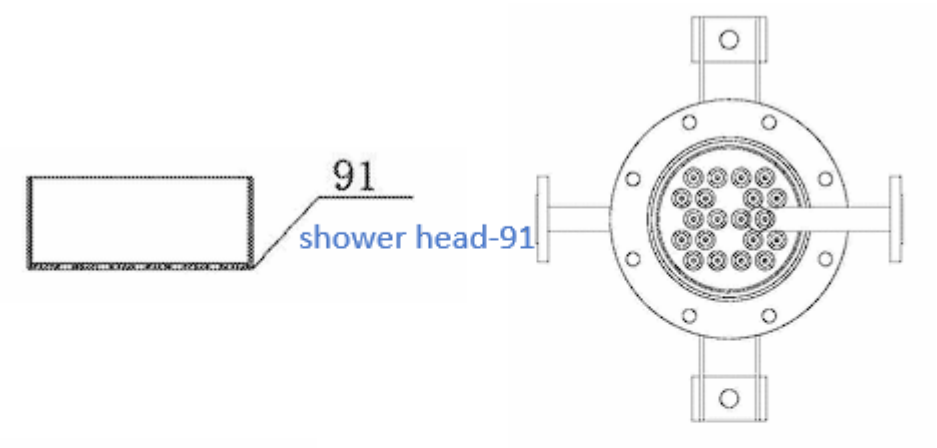
steam inlet-4
recombination outlet-5
steam through hole-411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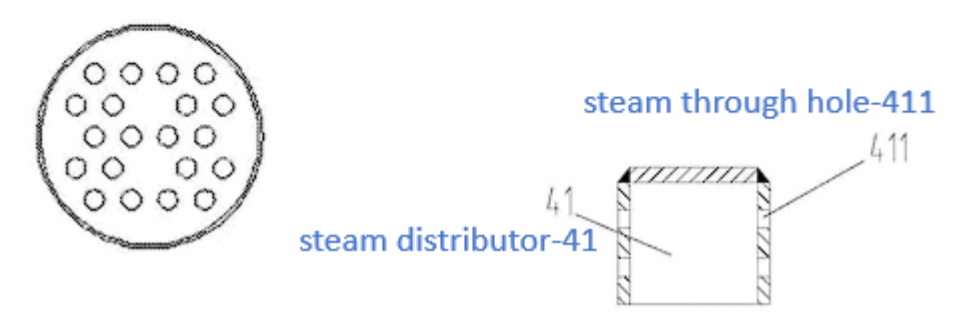
steam through hole-411
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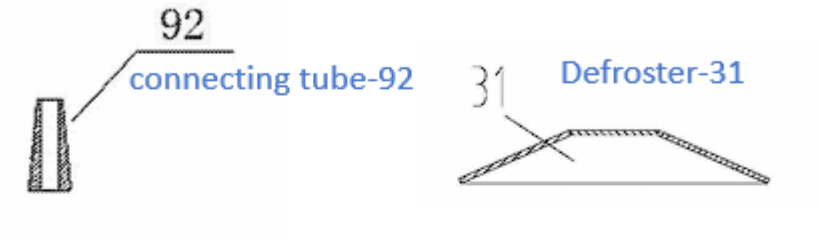
41
steam distributor-41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