

Air Belt Conveyor

**HENAN EXCELLENT
MACHINERY CO.,LTD**

Bulk Material Handling

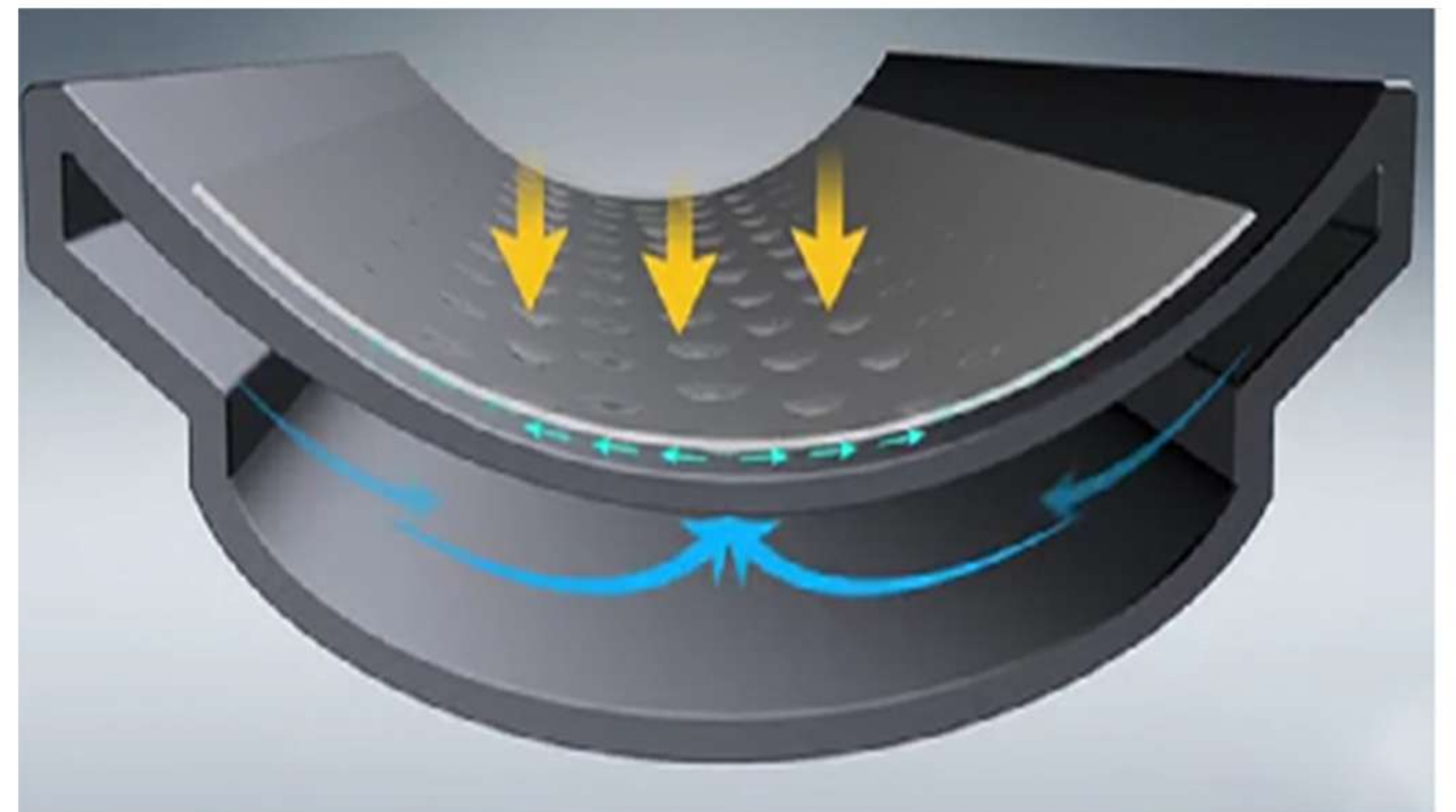


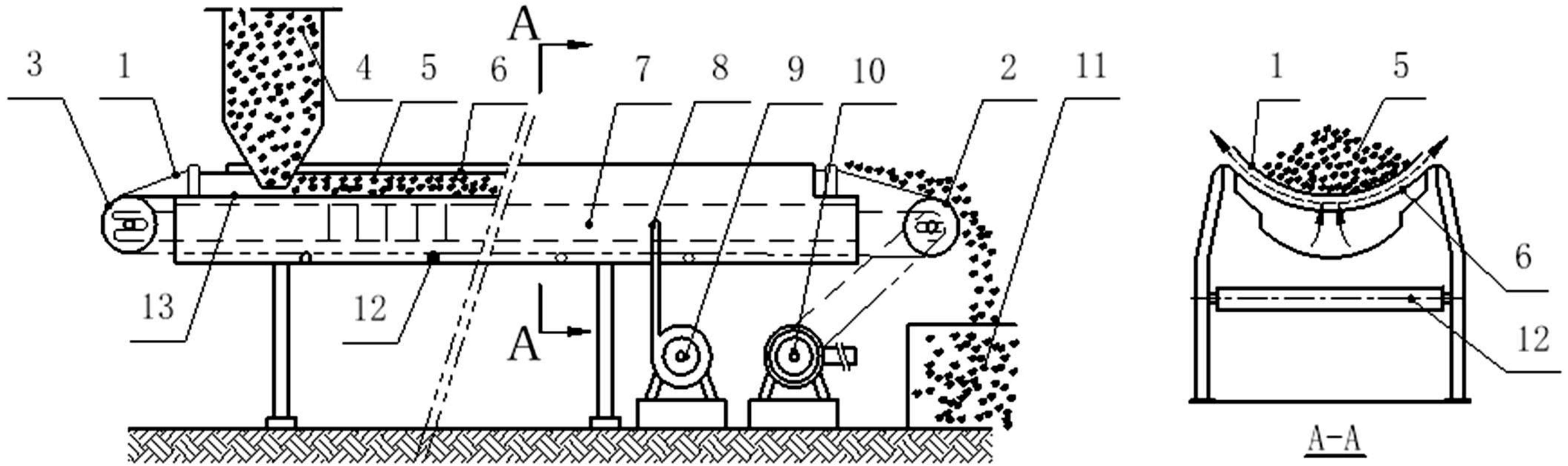
WORKING

PRINCIPLE

Air belt conveyor is a new type of conveying equipment with thin air film supporting conveyor belt and its materials. It uses air box with hole to replace the idler and idler frame on the traditional belt conveyor.

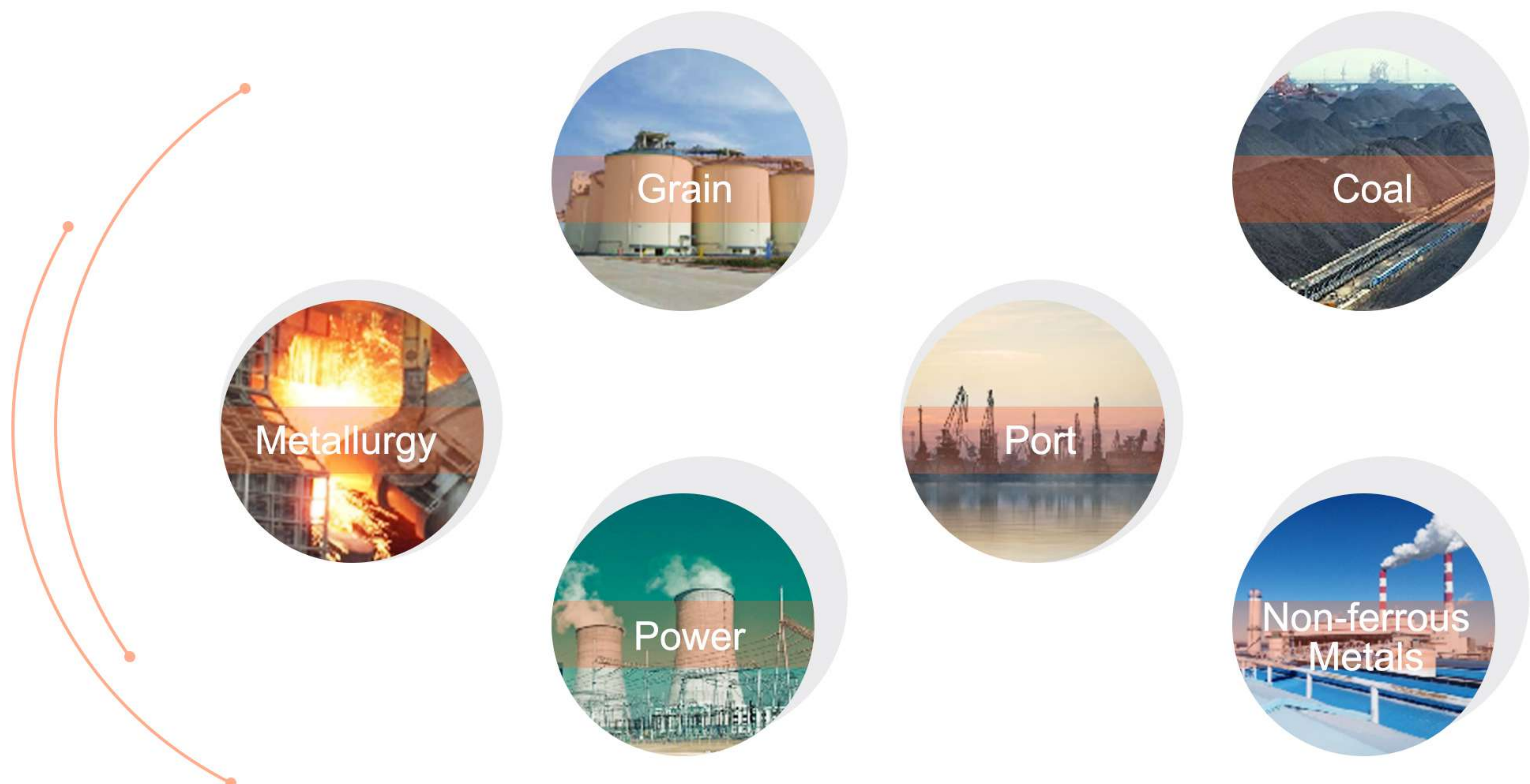
When the air source provides air with certain pressure and flow rate to the air box, the air in the air box escapes through holes in the pan-trough. Then, a layer of air film with certain pressure is formed between the conveyor belt and the pan-trough to support the conveyor belt and its upper materials. It changes the rolling friction of the traditional belt conveyor into fluid friction with air as the medium. After the test platform test, the simulated friction resistance coefficient of air belt conveyor reaches 0.00018(the traditional belt conveyor is 0.022), which greatly reducing the operation resistance, energy saving effect is significant.





- | | | | | |
|--------------------|-----------------|-------------------------|-----------------|---------------------|
| ① Conveyor Belt | ② Drive Pulley | ③ Tail Pulley | ④ Feeding Skirt | ⑤ Handling Material |
| ⑥ Pan-trough | ⑦ Air Box | ⑧ Air Intake Of Air Box | ⑨ Fan | ⑩ Drive Device |
| ⑪ Receiving Hopper | ⑫ Return Roller | ⑬ Throttle Orifice | | |

APPLICATION



AIR BELT CONVEYOR VS NORMAL BELT CONVEYOR

COMPARISON



• **Project**

• **Air Belt Conveyor**

• **Traditional Belt Conveyor**

Handling Capacity

The cross-sectional area of material loaded by air belt conveyor is relatively large. Under the same conditions, the cross-sectional area of the air belt conveyor is 15% larger than that of the trough roller belt conveyor. This means that the handling capacity of the air belt conveyor is 15% larger than that of the trough roller belt conveyor, and it also ensures no spillage.

Under the same conditions, the cross-sectional area of the trough roller belt conveyor is 15% smaller than that of the air belt conveyor. This means that the handling capacity of the trough roller belt conveyor is 15% smaller than that of the air belt conveyor.

Whole Structure

The whole machine adopts box-shaped section, with compact structure, good rigidity and excellent torsion and bending resistance.

The whole machine is distributed assembly structure, loose structure, poor rigidity, torsion and bending resistance is relatively not very good.

<ul style="list-style-type: none"> Project 	<ul style="list-style-type: none"> Air Belt Conveyor 	<ul style="list-style-type: none"> Traditional Belt Conveyor
Trestle Invest	<p>Since no need enclosed, wind load is small, then the overall steel structure is lighter. In addition, the trestle does not need to close corridors, saving a lot of material costs.</p>	<p>Under the same environmental conditions, the weight of the trestle is relatively heavy, and it needs to close the corridor, so the overall cost of the trestle is much higher than the air belt conveyor.</p>
Maintenance Costs	<p>Because the whole machine rotation parts are less, so the daily maintenance cost than the trough roller belt conveyor to save 70% to 75%.</p>	<p>Because the whole machine contains a large number of idlers, T the roller and rubber belt wear caused by rotation is relatively fast, therefore, Therefore, the daily maintenance cost is much higher than the air belt conveyor.</p>
Running Resistance	<p>The running resistance coefficient $f=0.007\sim0.012$, the running resistance is small, the tension of the belt is also small, no deviation, no rubbing. Compared with the trough roller belt conveyor, the service life of the rubber belt can be extended by 2 to 3 times.</p>	<p>The running resistance coefficient $f=0.03\sim0.045$, the running resistance is large. Maybe cause the belt deviation or rubbing. and the rubber belt service life is only $1/2\sim1/3$ of the air belt conveyor.</p>
Overload Capacity	<p>The overload capacity of air belt conveyor is very strong, the overload coefficient is generally from 10% to 30%, and even in the case of overload can load start.</p>	<p>The overload capacity of trough roller belt conveyor is relatively poor.Overload operation, there may be spillage, and it is difficult to start after overload.</p>

• **Project**

Sealing Performance

• **Air Belt Conveyor**

The unique structure is convenient for the overall sealing. Good sealing performance will not cause dust, and will not affect equipment maintenance and repair.

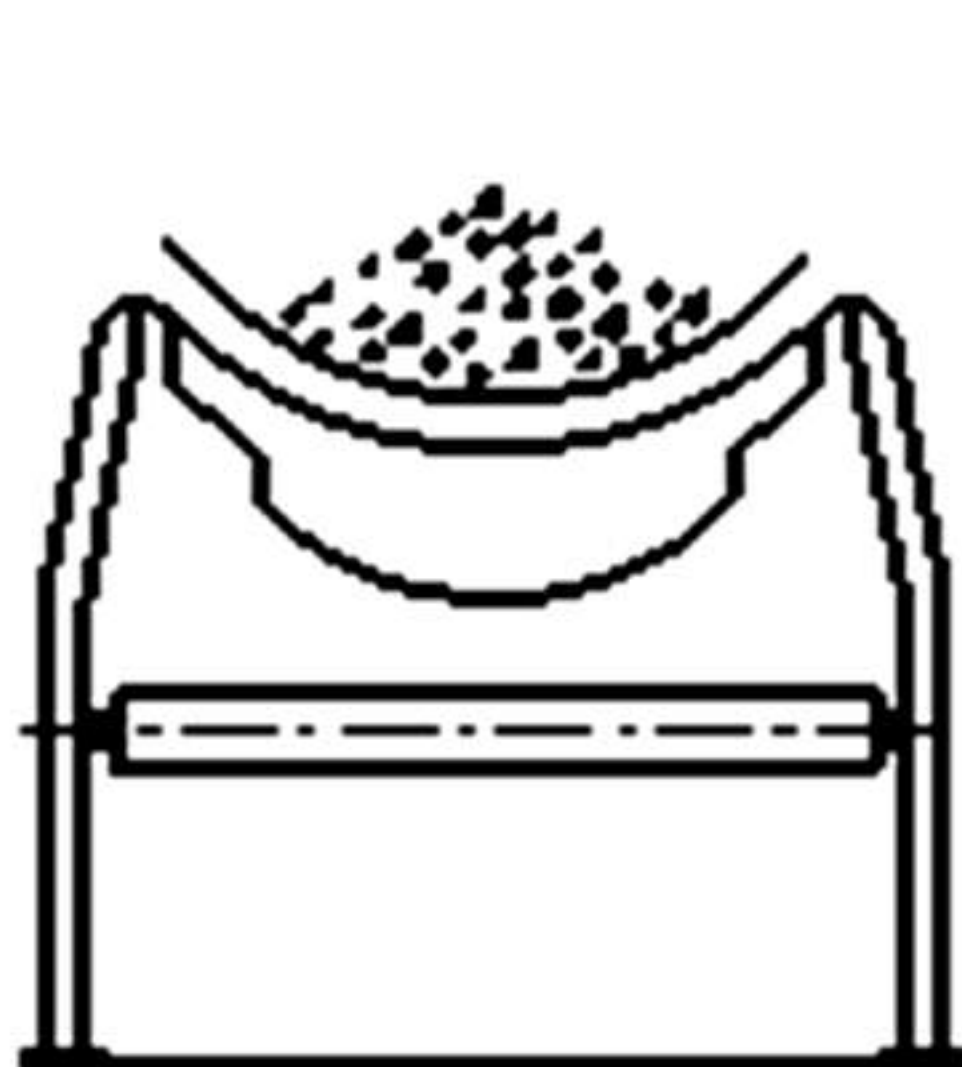
• **Traditional Belt Conveyor**

It is difficult to achieve overall sealing, and the sealing performance is relatively poor. In addition, it is not conducive to equipment maintenance or repair after sealing.

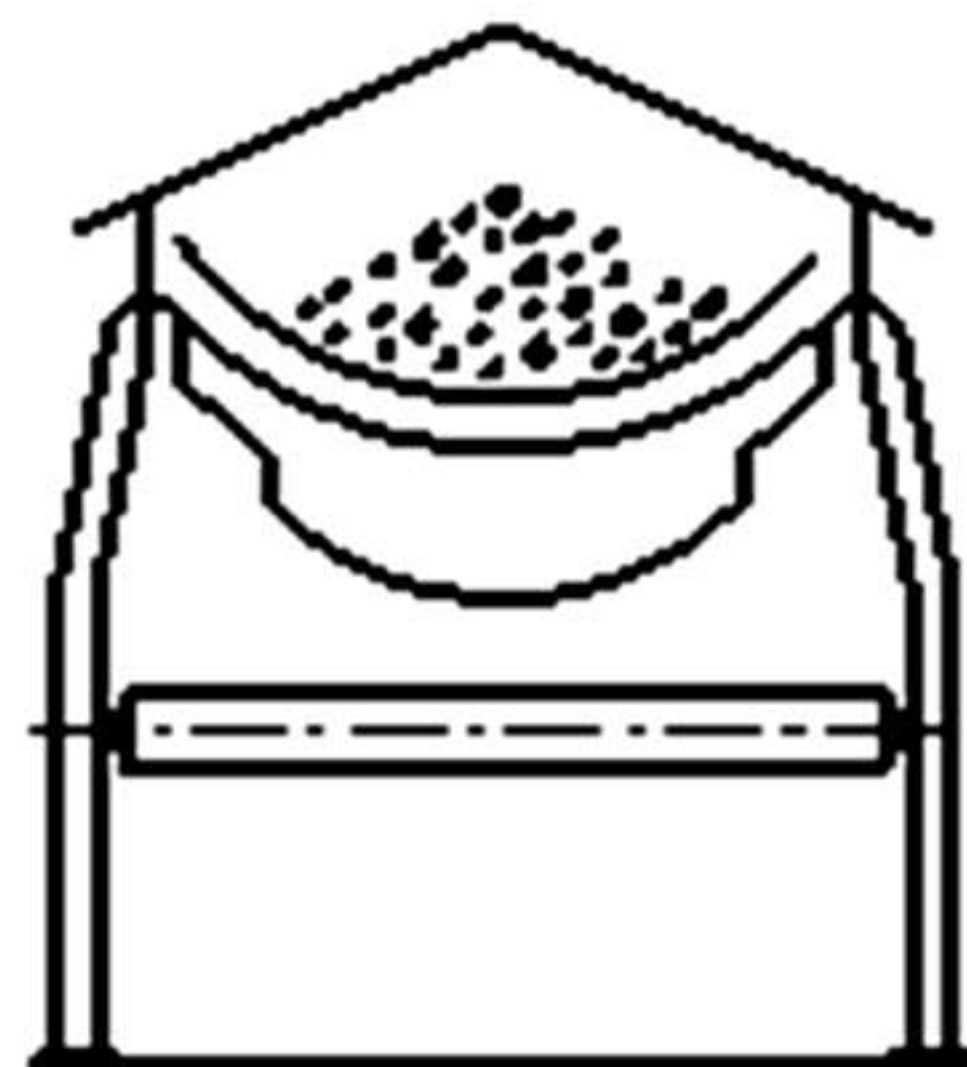
MAIN STRUCTURE TYPE

The structure of air belt conveyor is divided into two types: half air cushion type and full air cushion type. The half air cushion type is also called mixed type, only the upper branch conveyor belt is supported by air cushion. The full air cushion type means that the upper and lower branch conveyor belts are supported by air cushions.

01 Half Air Cushion Type



• Mixed-Open type

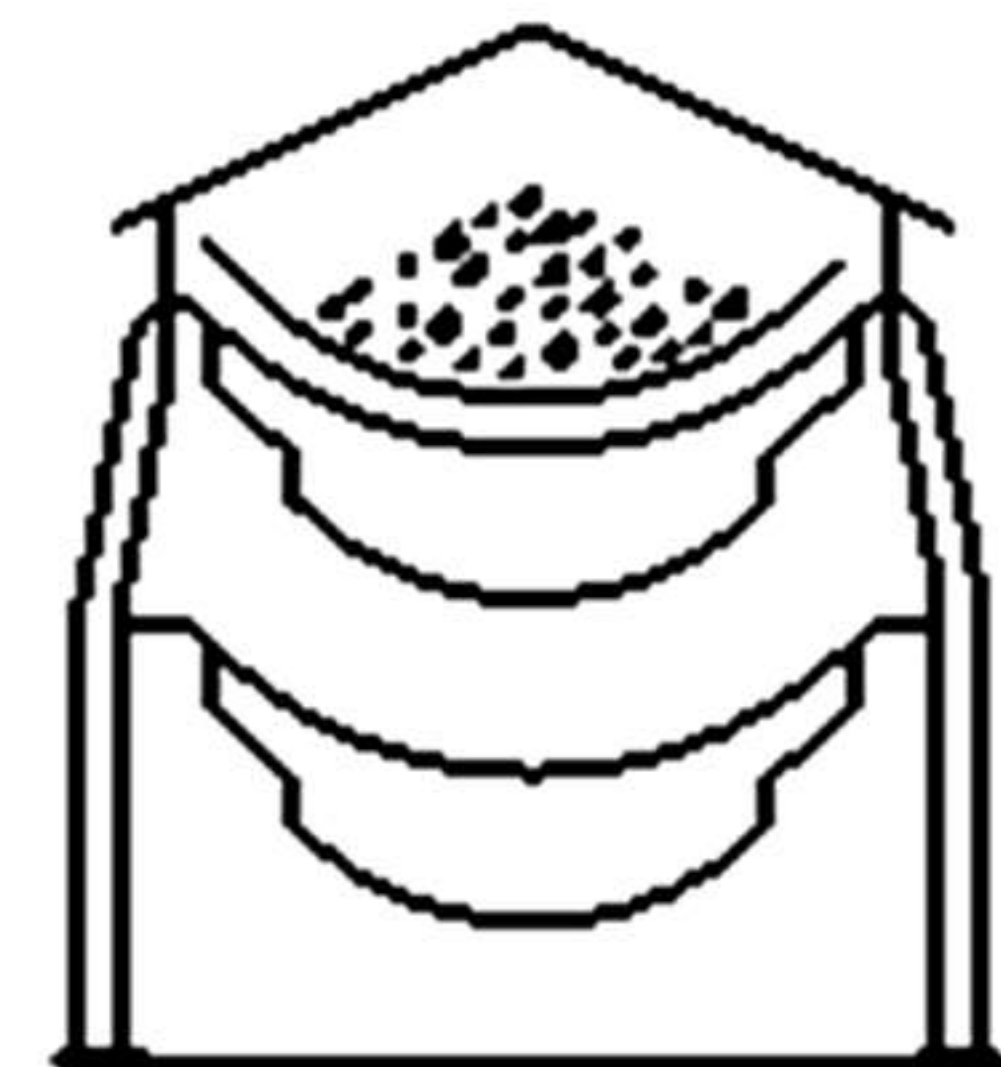


• Mixed-Seal type

02 Full Air Cushion Type



• Full-Open type

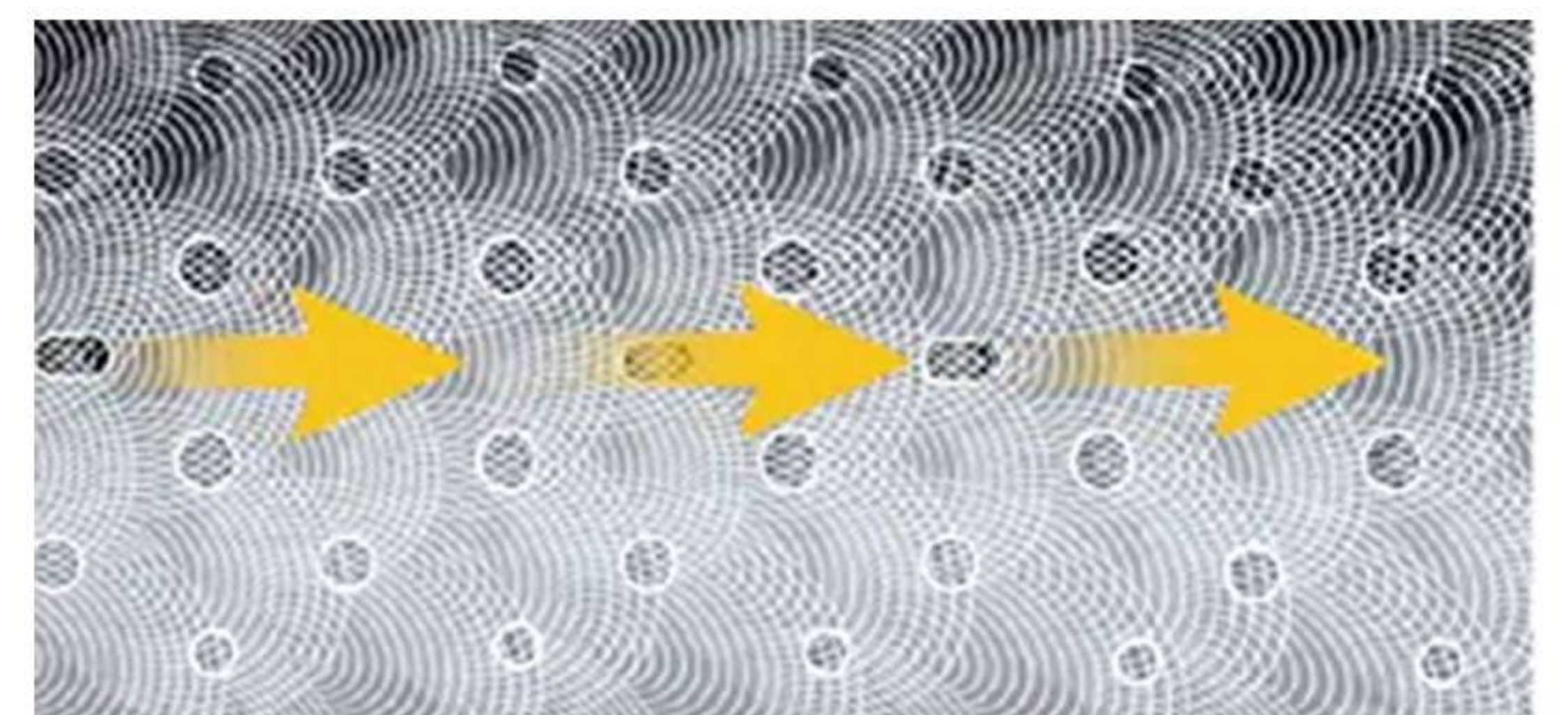
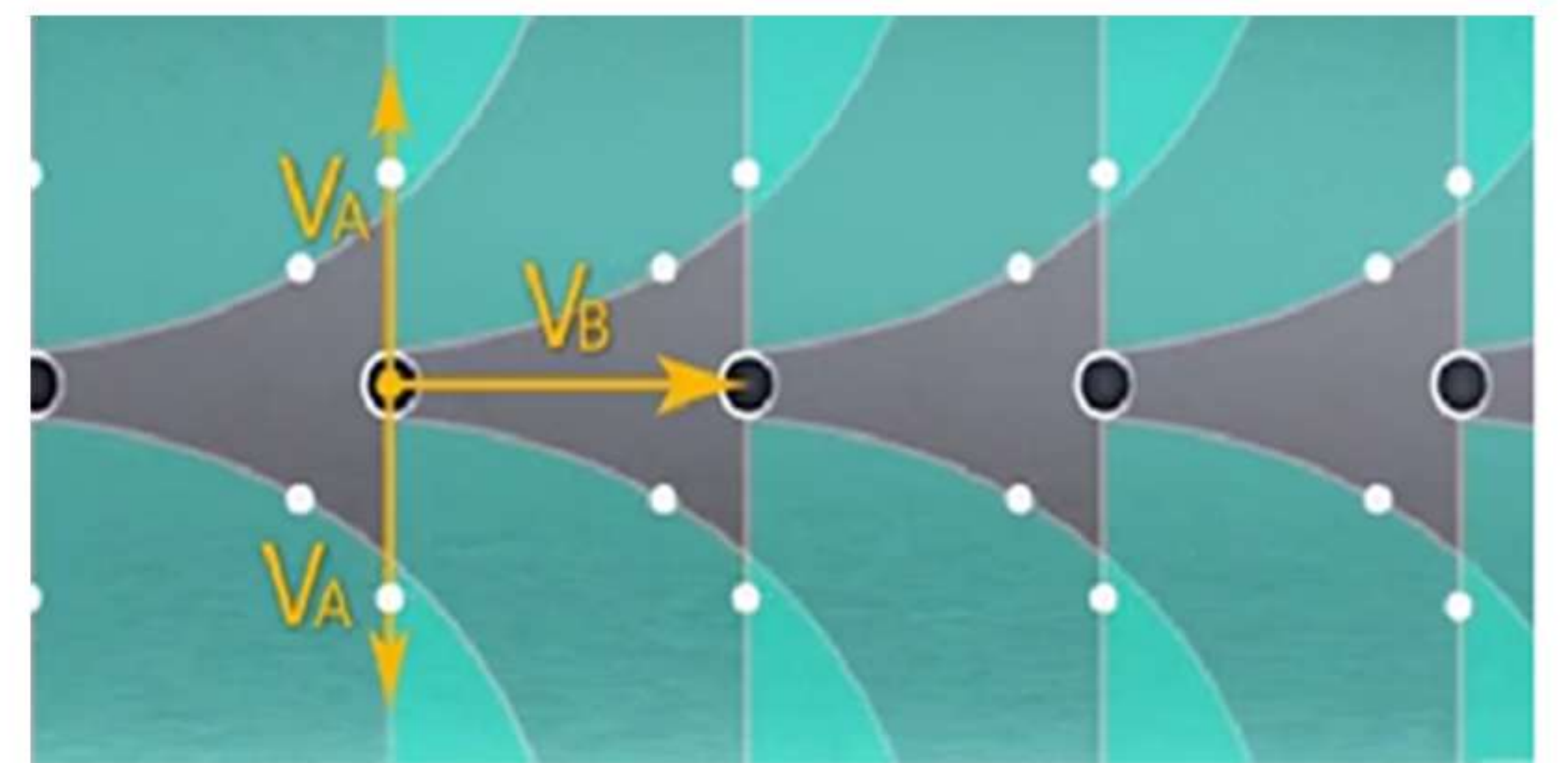


• Full-Seal type

NINE INNOVATIVE TECHNOLOGIES

01. Innovation In Design Theory

Our company adopts the theory of water ripple flow direction, and the layout of throttling holes is designed by five-point throttling holes. This design method replaces the parallel arrangement of throttle holes of the first generation air belt conveyor, which can overcome the problems of poor uniform stability of the air cushion, clogged throttle hole, local friction between the belt and the disk slot, not obvious energy saving effect, and difficulty in starting heavy load. It ensures the required stiffness of the air cushion under various working conditions, has strong overload capacity, and can easily start heavy load directly. The five-point throttling hole arrangement design ensures the required air cushion stiffness under various working conditions, has strong overload capacity, and can be easily directly started with heavy load.



02. Design Innovation Of Air Box Structure

In summarizing the domestic and foreign the air box cross section shape of first generation air belt conveyor and the existing problems, our company cooperated with Xi 'an Jiaotong University to conduct in-depth research on the formation principle of air cushion and the distribution law of air flow in the box, and through a large number of simulation test research, optimized the design of the air box section shape of the second generation of air belt conveyor. The air box cross section adopts the combination form of double arc and broken line, which is not only easy to manufacture, but also conforms to the law of air flow. This design method not only achieves the effect of stabilizing the air pressure, but also improves the uniform stability of the air cushion.

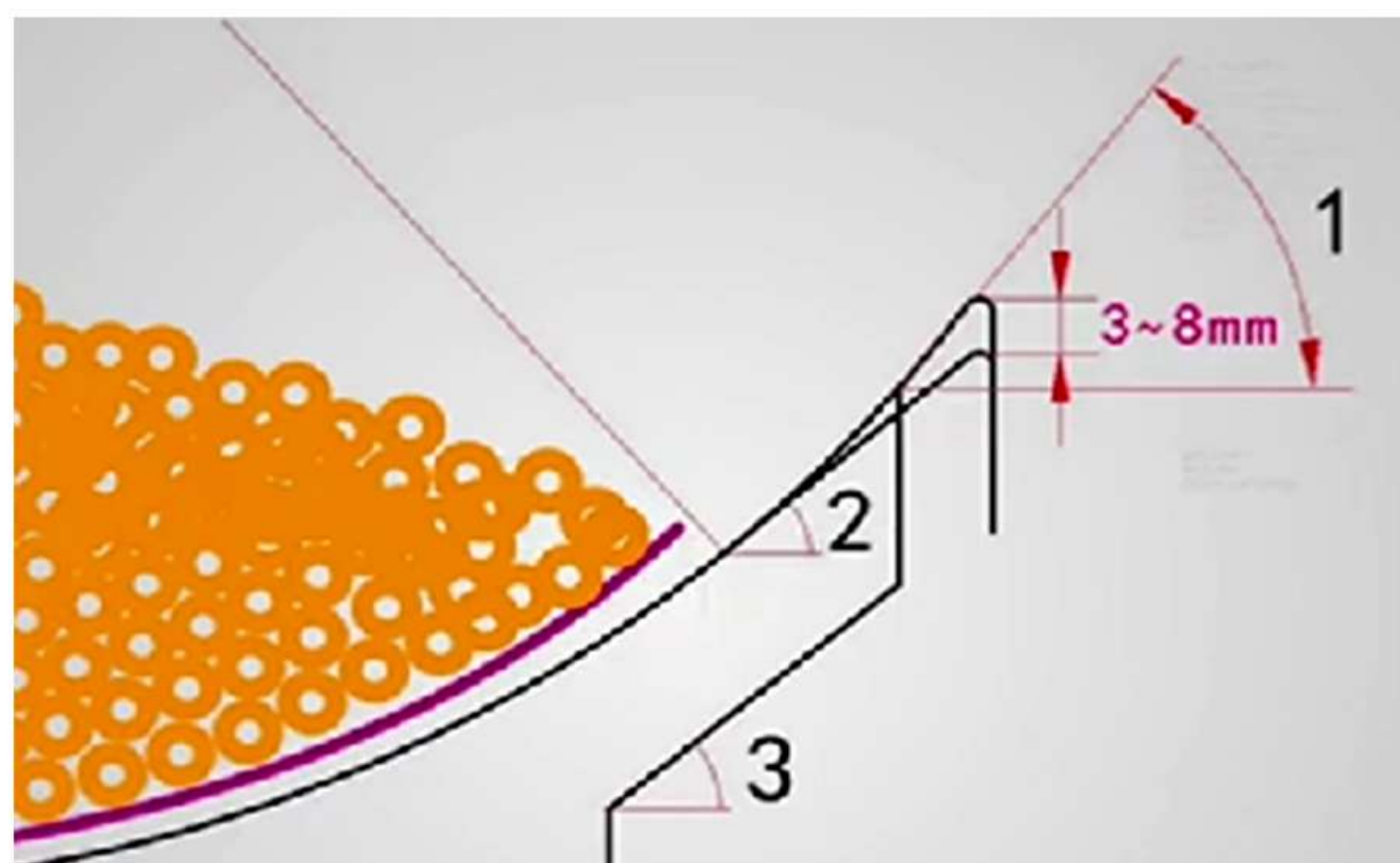
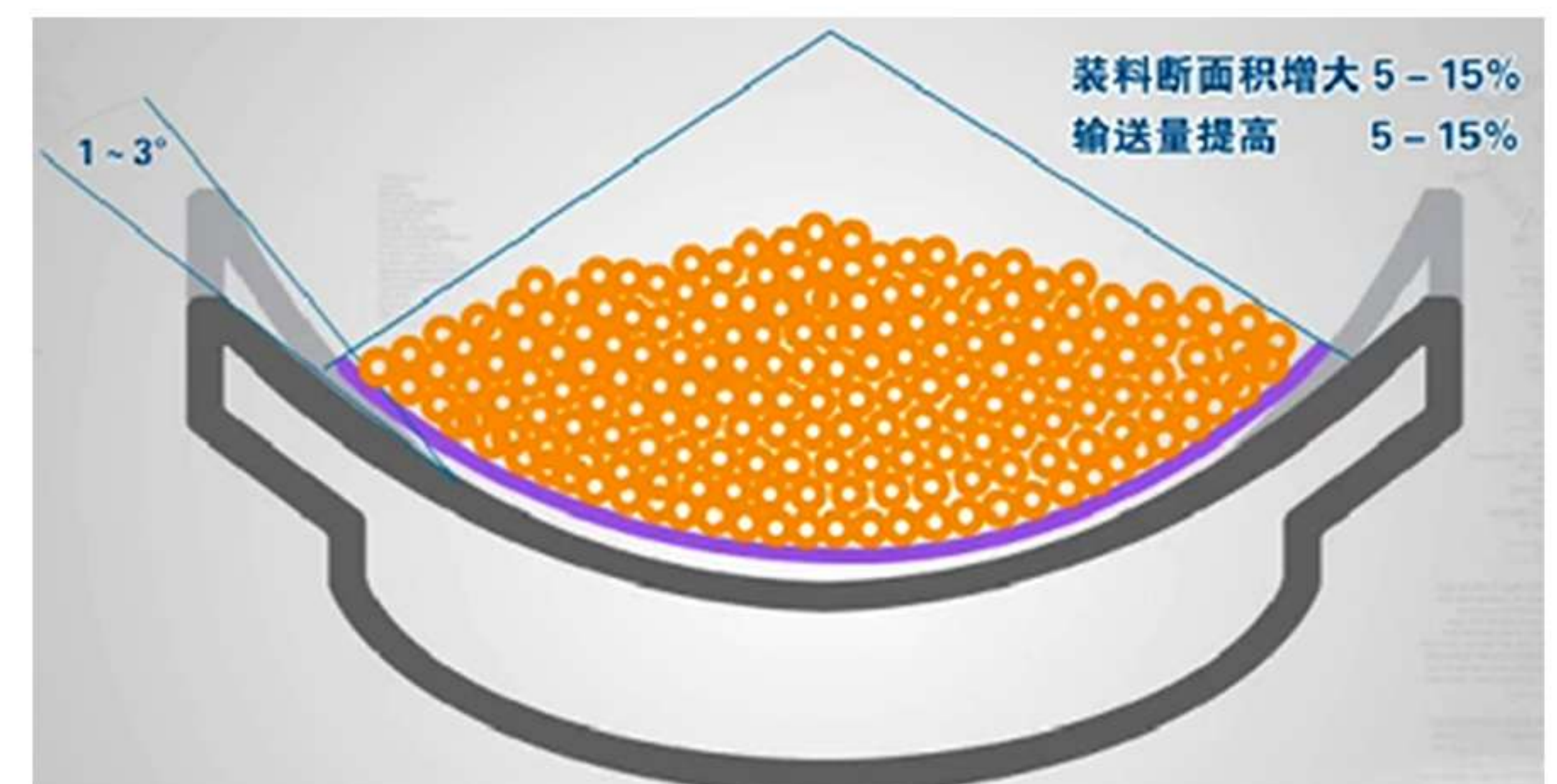


03. Design Innovation Of Pan-trough Structure

The second generation of air belt conveyor first adopts the method of twice slot angle design.

The first slot angle is used to determine the radius of the pan-trough circular arc. The second slot angle determines a section of circular arc and two sections of tangent straight lines to form a smooth transition of the composite pan-trough structure.

As shown in the figure on the right, the two sides height of the pan-trough are lower by 3 ~ 8mm by the twice slot angle design compared with the full circular arc pan-trough produced by the once slot angle design method. This design method can structurally ensure that the conveyor belt will not wipe the edge.



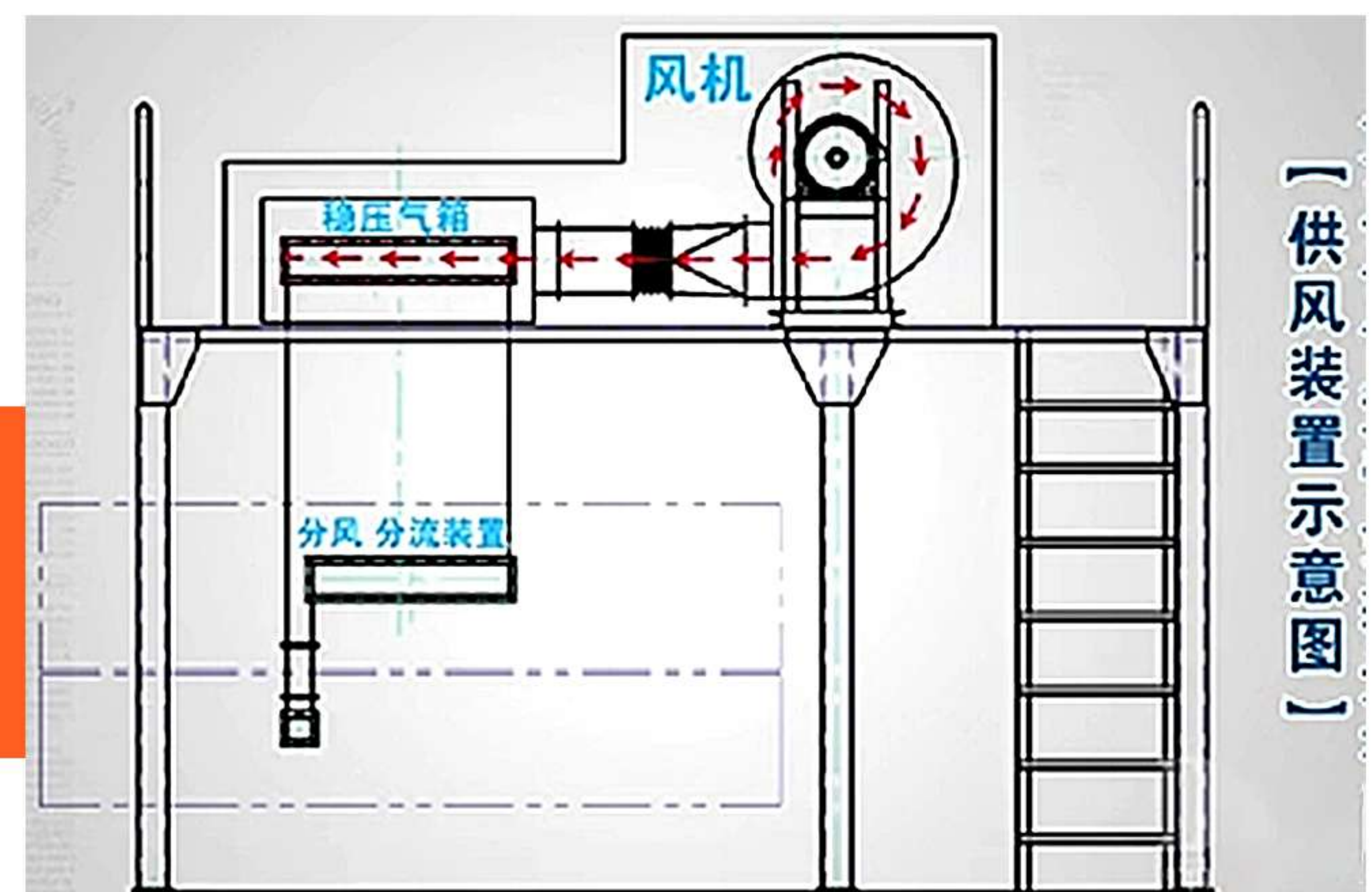
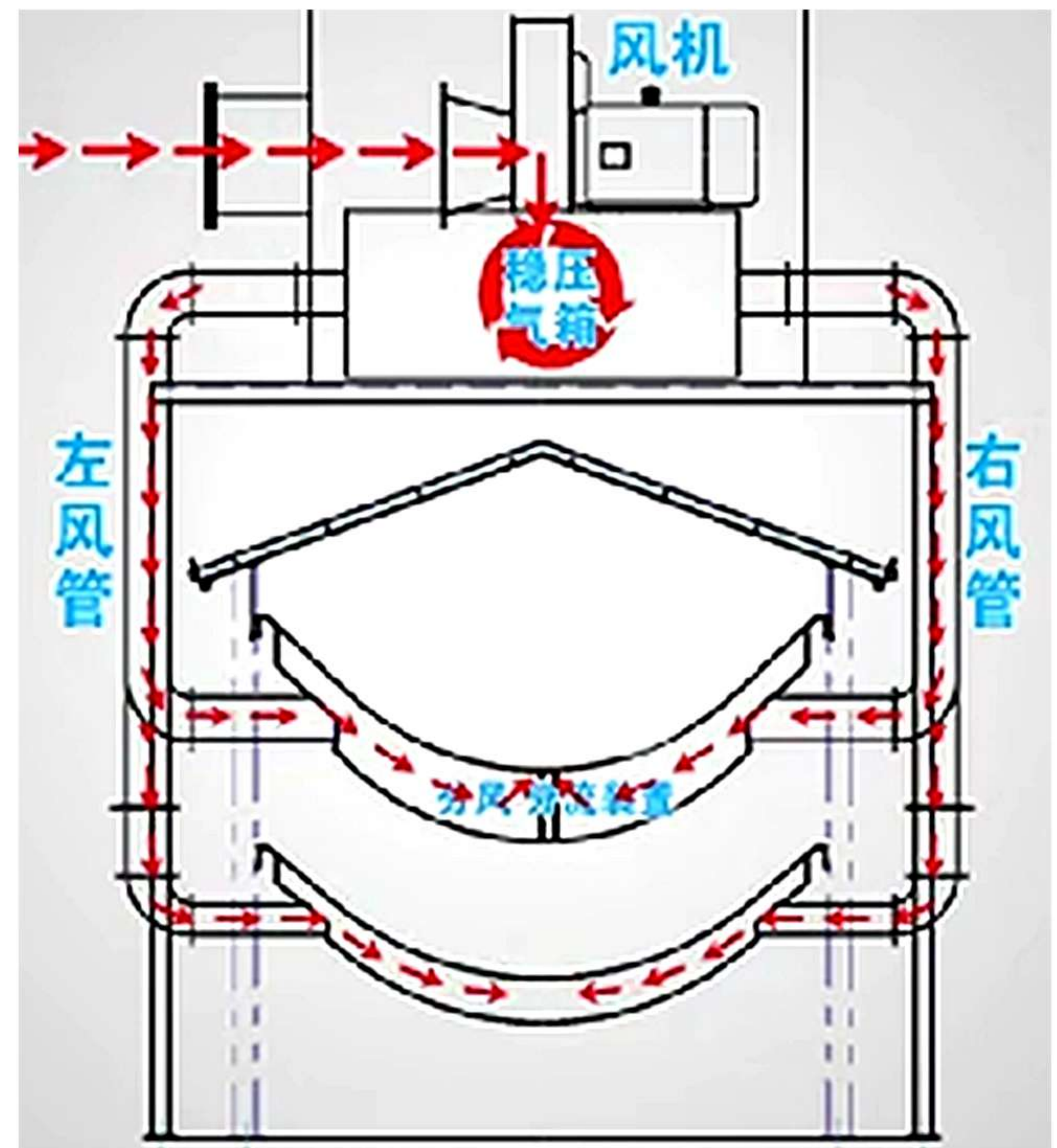
In addition, if the air volume and pressure match properly, the phenomenon of belt wiping can be completely eliminated, then the technical performance of air belt conveyor can be greatly improved.

04. Design Innovation Of Air Supply Device

The second generation of air belt conveyor first carries on the innovation design to the air supply device, which adopt symmetrical air supply, add pressure stabilizing air box and air distribution device.

Air flowed from the fan outlet, first enter the pressure stabilizing air box, which can stabilize the high-speed airflow and form a relatively stable airflow. Then the stable airflow is symmetrically fed into the air source box from the left and right air distribution pipes on both sides of the pressure stabilizing air box, and through the newly added air distribution device in the air box, the air is guided and diverted, so that the air quickly filled the whole air box, forming a stable gas box pressure.

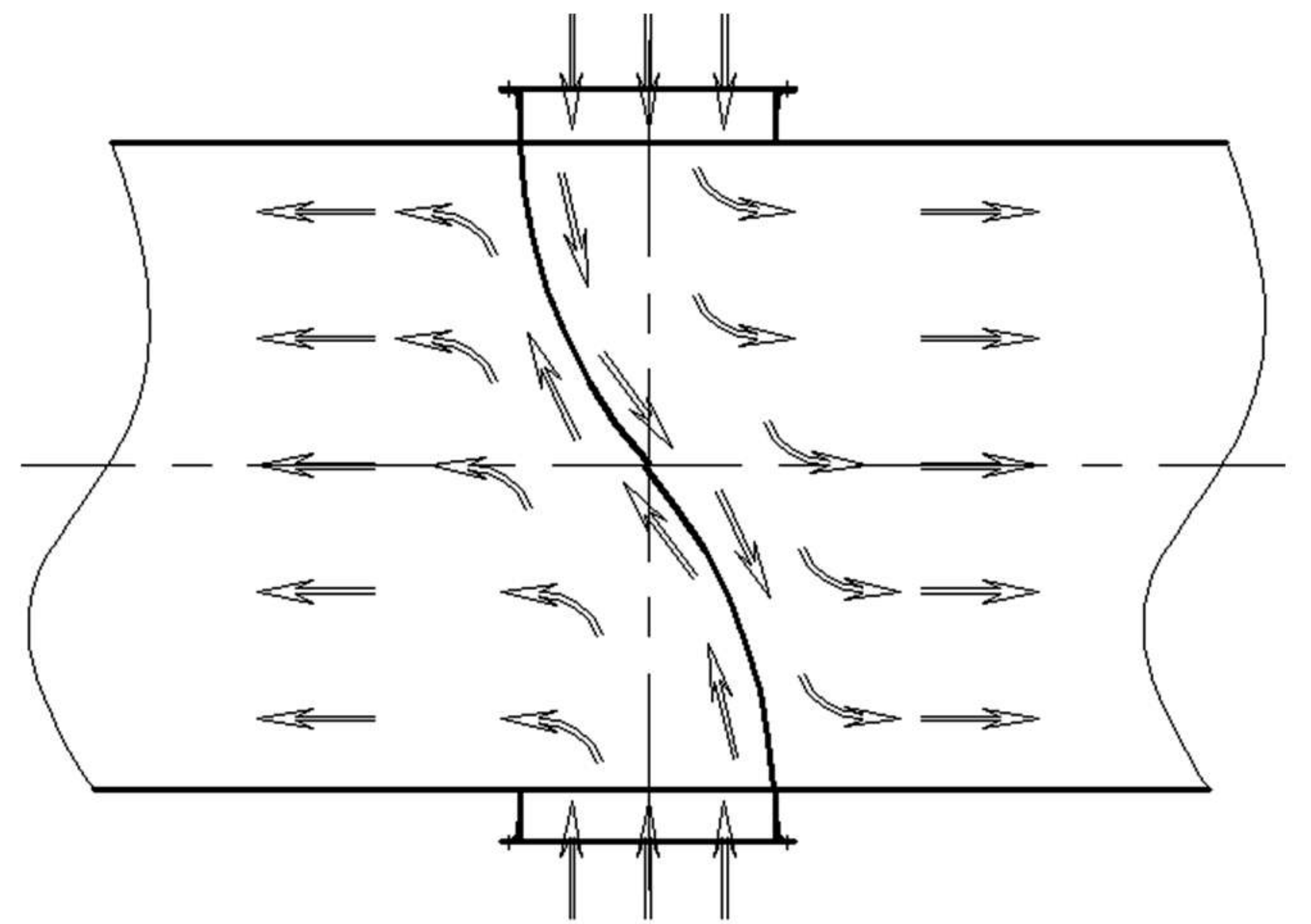
This new type of air supply device not only reduces the airflow interference and cyclone vortex in the air box, reduces the resistance loss along the way, but also promotes the air in the air box to form a relatively regular laminar flow, greatly improves the air static and dynamic pressure conversion efficiency, and increases the energy saving effect by 15~20%.



05. Design Innovation Of Cleaning Device

Our company and Xi'an Jiaotong University have jointly developed a successful mathematical model for reasonable matching of air volume and pressure - a mature calculation procedure has been established according to the material properties, particle size, handling capacity, conveying speed, working environment and other factors, which makes the matching of air volume and pressure more accurate.

In addition, our company has successfully developed new fans such as 5-48, 5-50, 7-36, 6-41, 6-27, etc., which match well with the characteristics of air belt conveyor, thus greatly improving the technical performance. At the same time, our company has successfully developed 5-48, 5-50, 7-36, 6-41, 6-27 and other new types of fans which are used well with the air cushion belt conveyor, thus greatly improving the technical performance of the air belt conveyor.

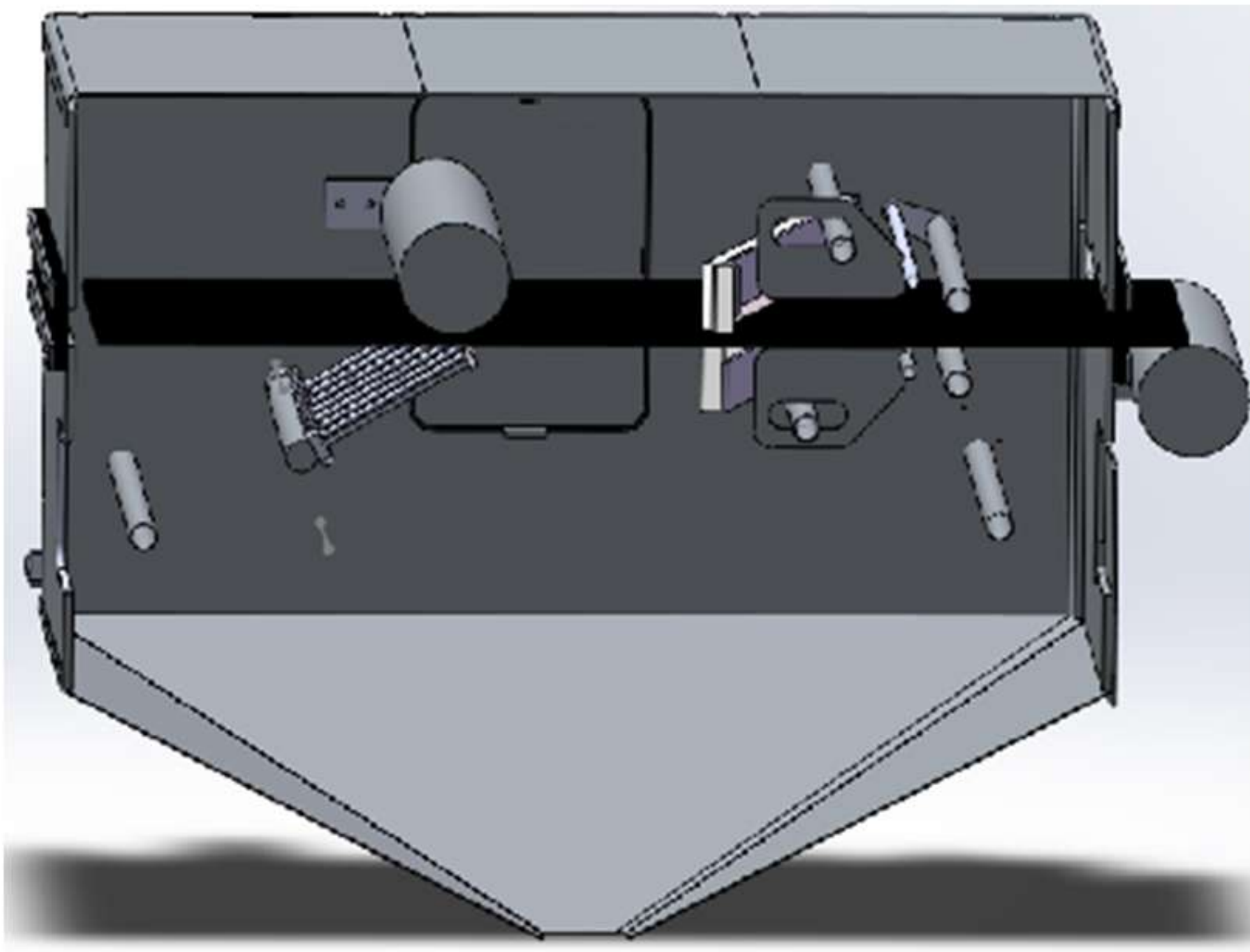


06. Design Innovation Of Cleaning Device



Adopt New Type Of Cleaner





Adopt Water Cleaning Device



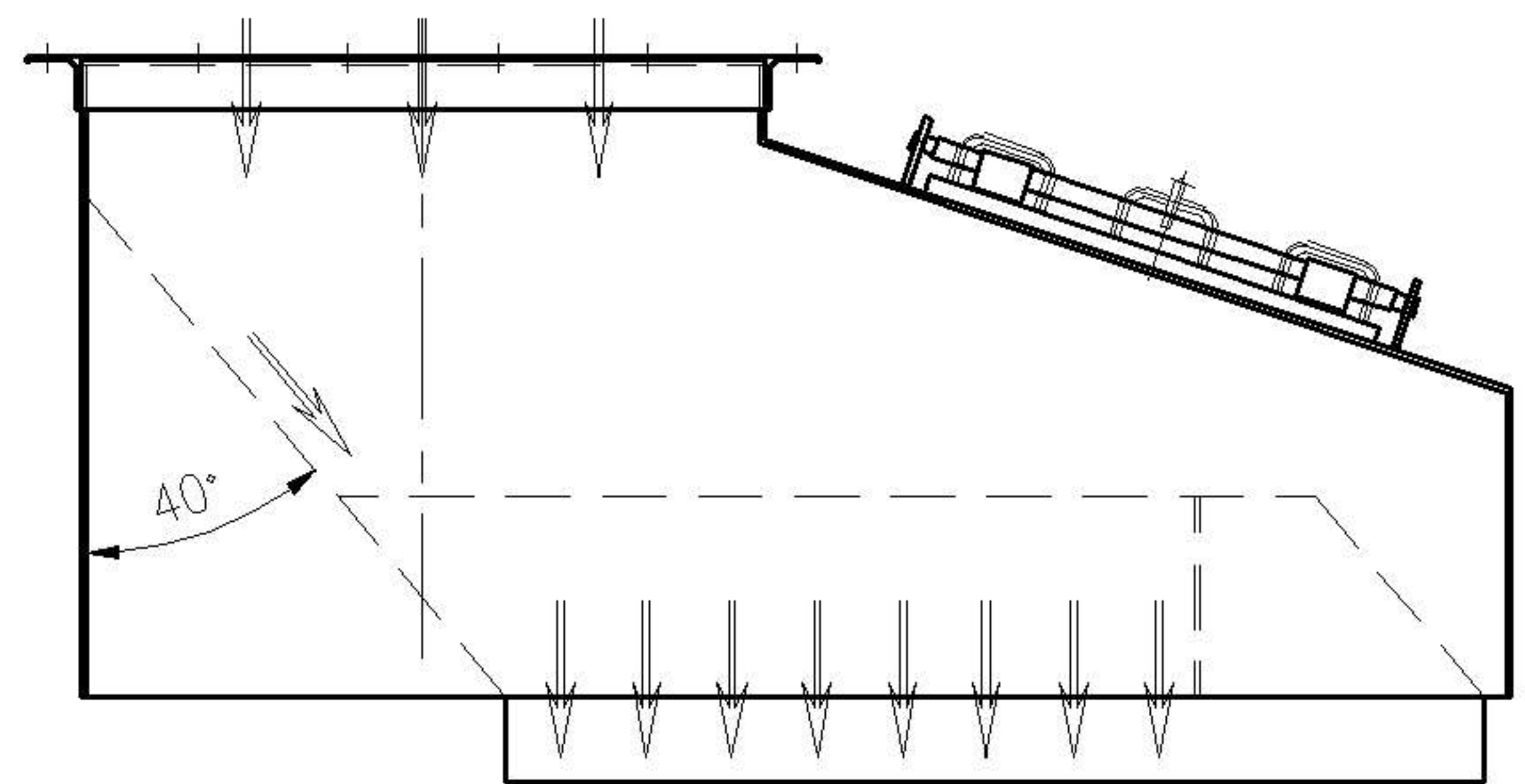
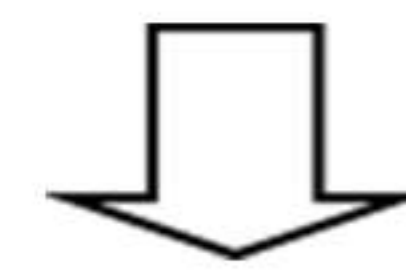
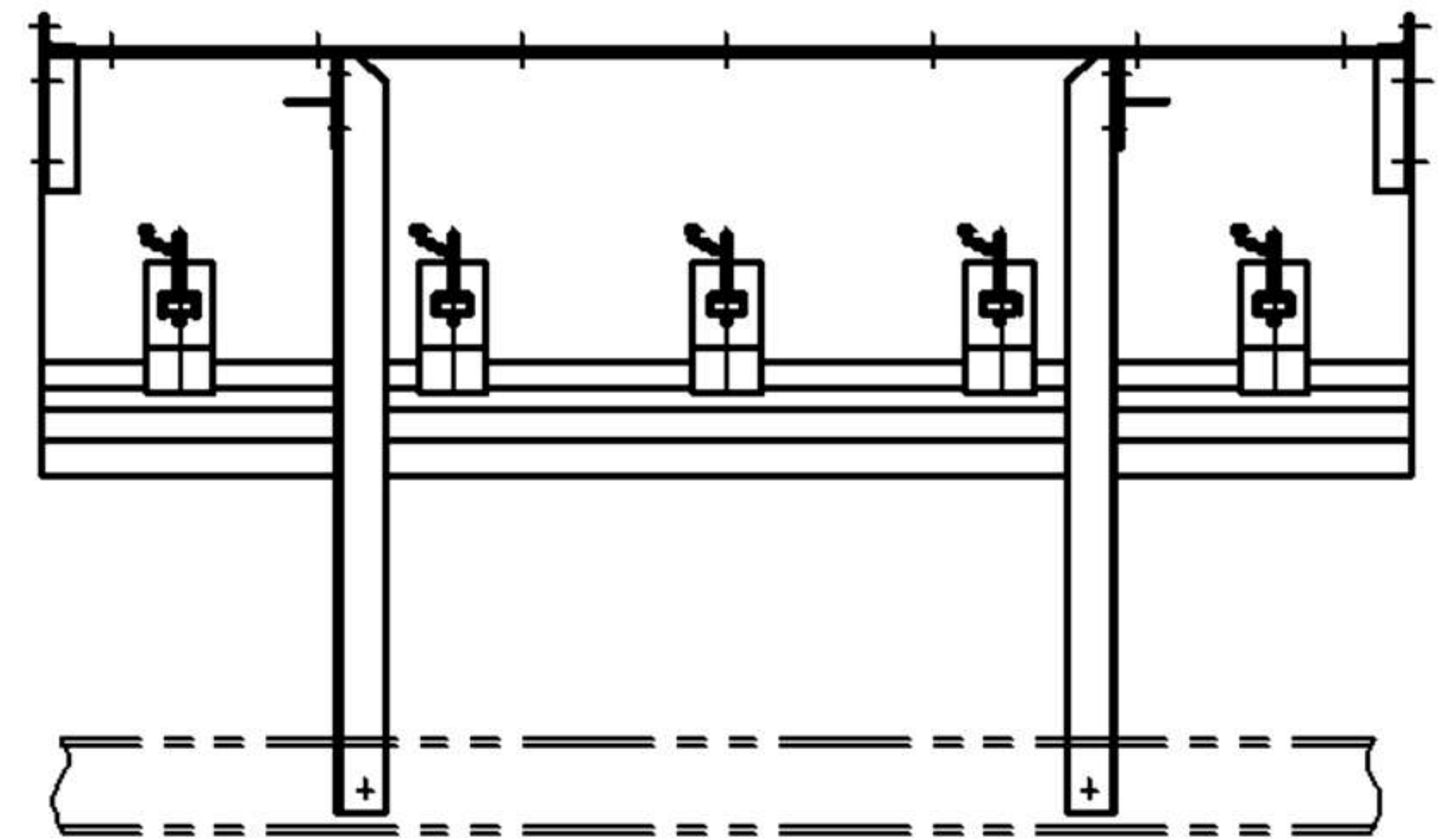
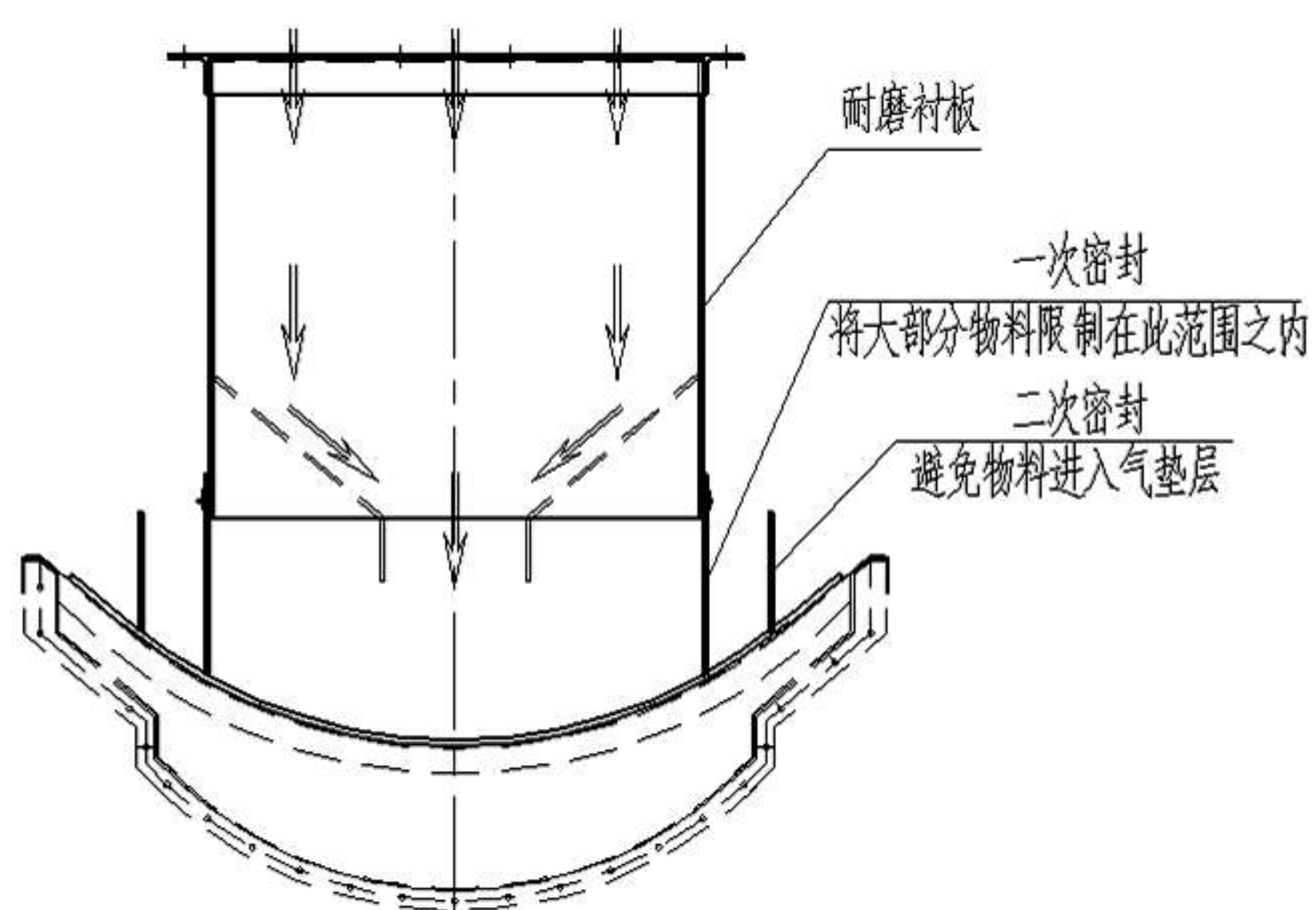
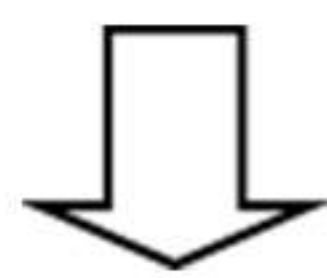
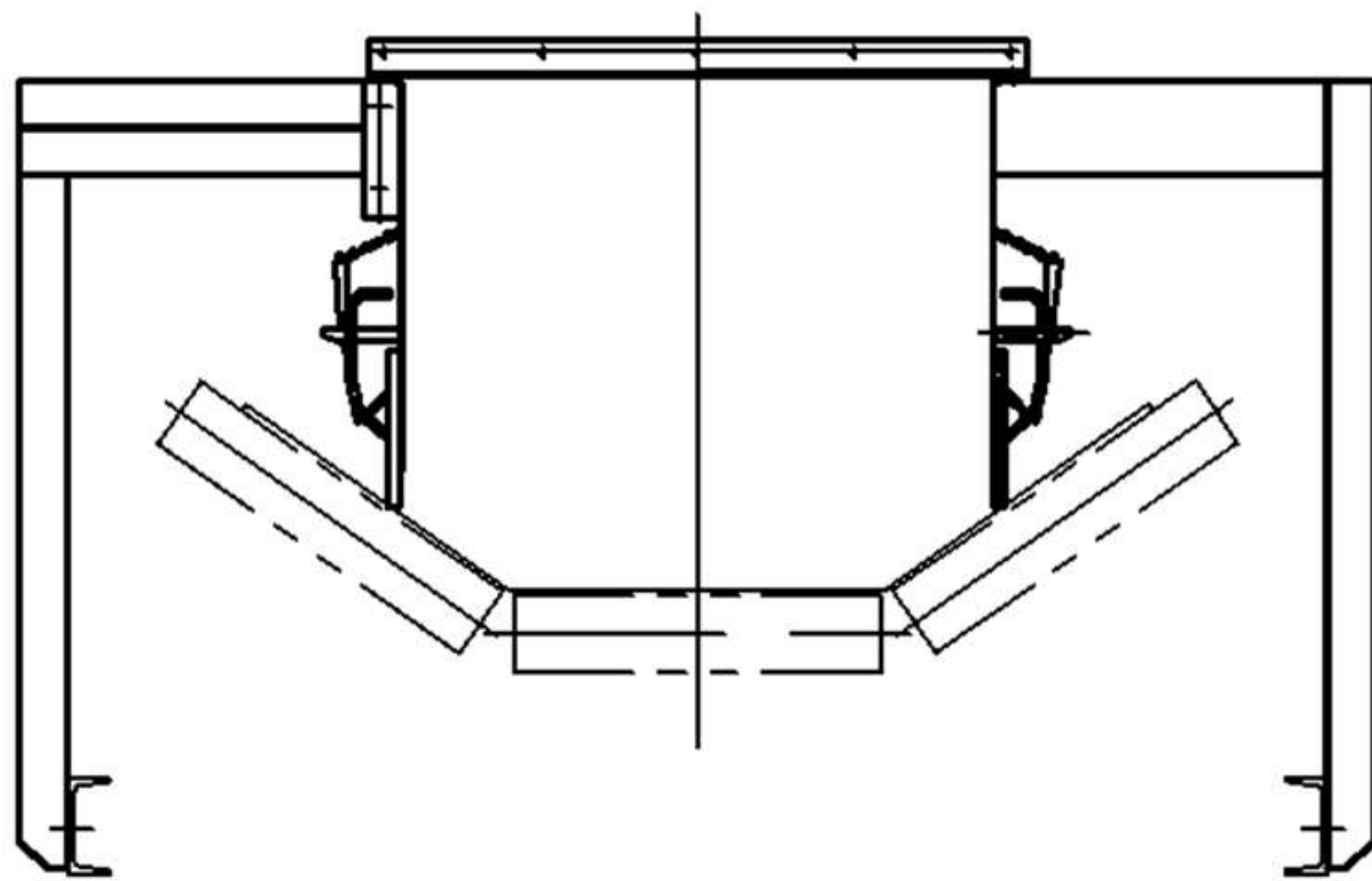
Adopt Turning Belt Device



07. Design Innovation Of Feed Skirt Structure

The main innovations in the design of the feed skirt as following:

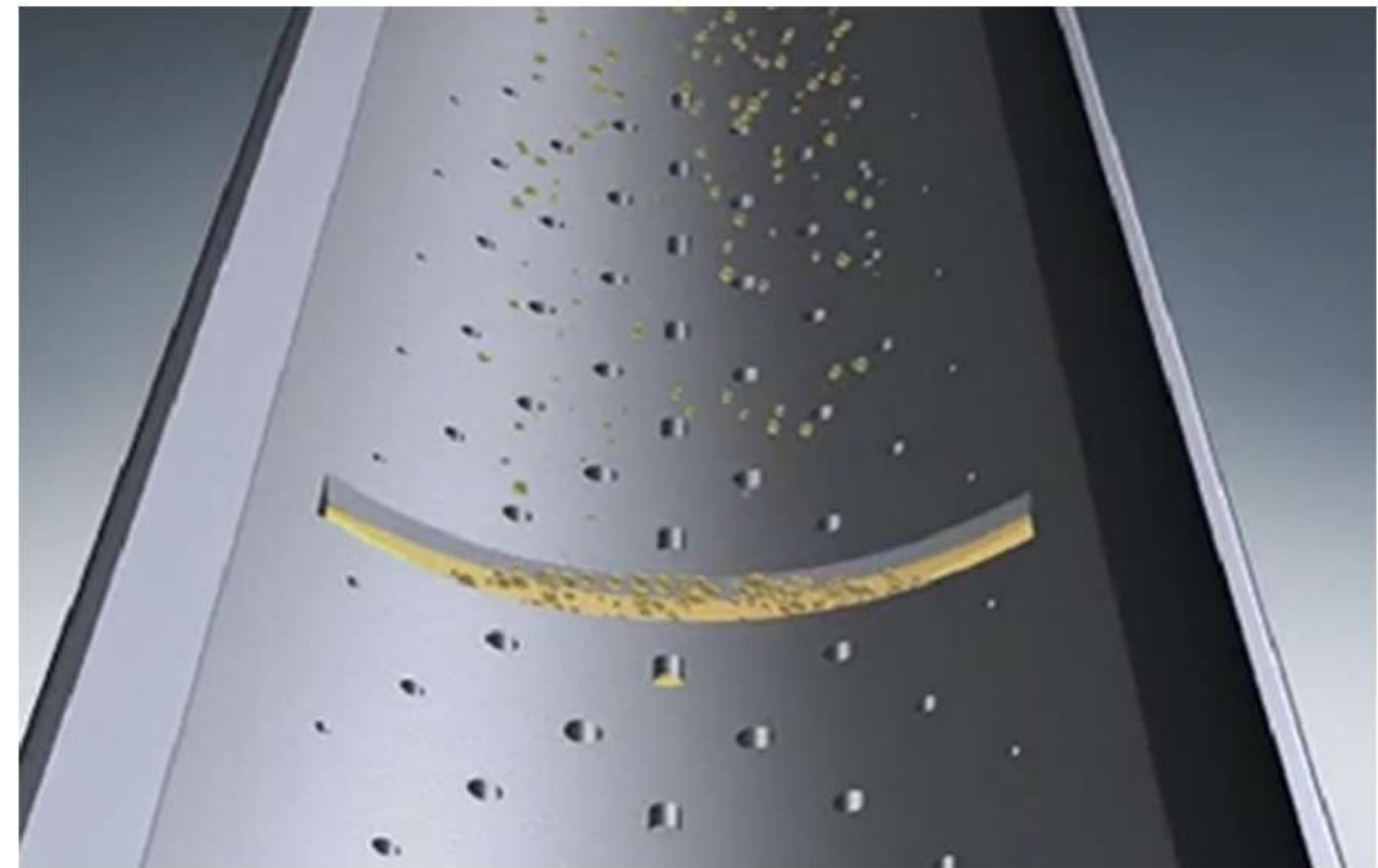
01
To Conveyor Belt: Impacting, Centering, Prevent Deflection



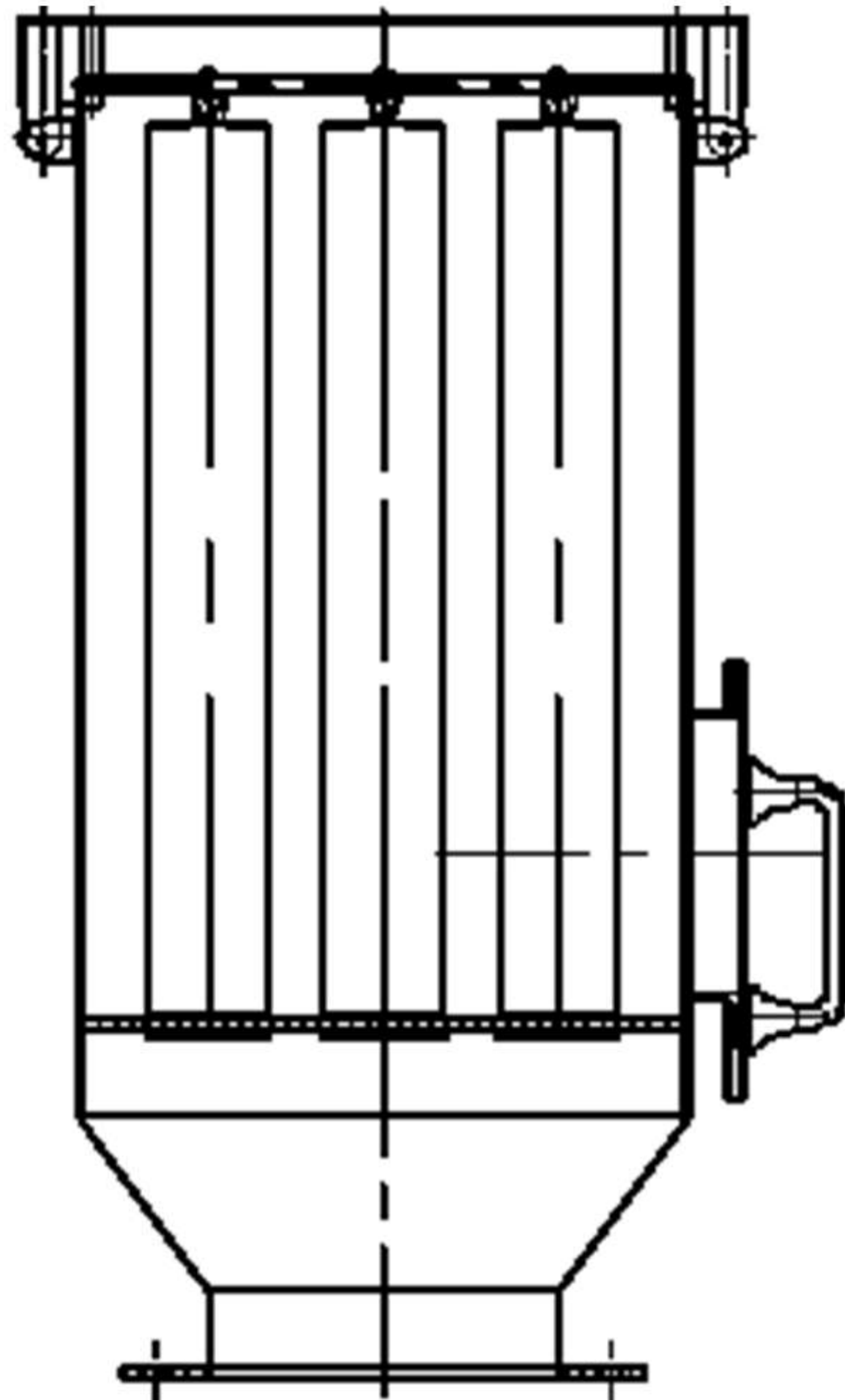
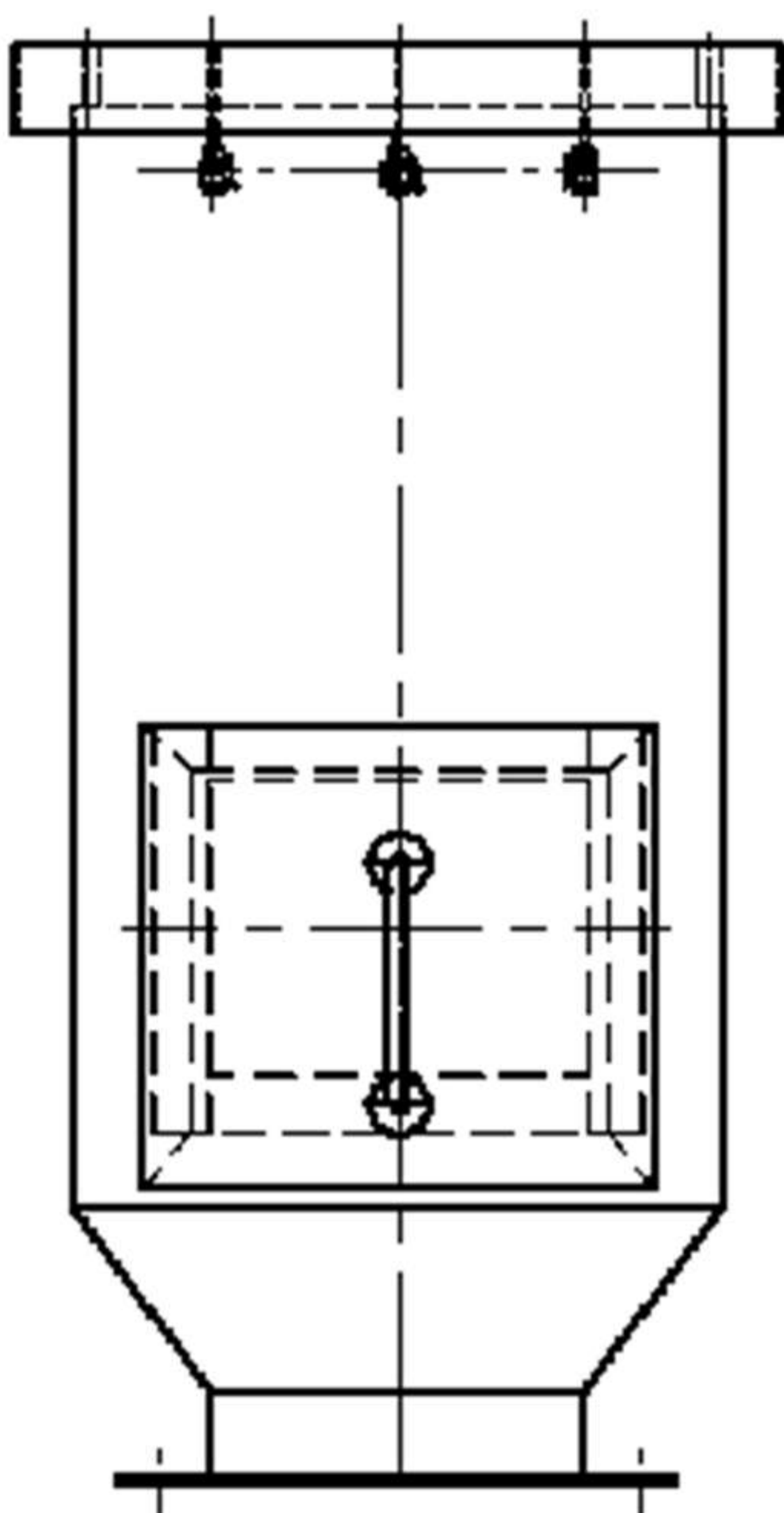
02
To Material: Guide Flow, Prevent Clamped

08. Design Innovation Of Leaky Material Storage Device

Automatic collection of leaky material from air cushion, solving the problem of air cushion layer trapped material, extending the service life of the rubber belt and pan-trough.



09. Design Innovation Of Dust Removal Device



10. Innovation Of Testing And Detecting Devices







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