

Feasibility Study on Reducing the Breakage of the Chute in the Belt Hopper

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Abstract

In iron and steel enterprises, the conveying volume of raw materials is large, and in the hopper under the belt, the speed of the material line is often faster, which has a large impact on the chute, and often wears through the chute to cause material leakage. We have conceived a method that can effectively redirect the direction of the material line in the hopper under the belt, reduce the speed of the material line and avoid breaking through the chute, prevent the belt from deviating due to the deflection of the material line, and prevent A belt hopper chute that causes material leakage or even crushes the belt.

Keywords

Conveyor; Lower Hopper Chute; Redirect; Reduce Speed; Prevent Wear.

1. Introduction

Iron and steel enterprises have large raw fuel throughput and fast belt transfer speed. In the belt hopper, the material line speed is often faster, which has a large impact on the chute, and often wears through the chute to cause material leakage. In addition, the material line bounces directly to the chute after passing through the lowering hopper, and rebounds again through the chute. The drop point of the material line is often not in the middle of the lower conveyor belt, and the long-term offset and unloading will cause the belt to be stressed on one side, resulting in If the belt is deviated and the material is offset at the same time, it is more likely to cause leakage, or even crush the belt, which seriously affects the raw fuel supply of the blast furnace. [2].

2. Conceptual Design of the Belt Hopper Chute

In order to solve the above technical problems and overcome the shortcomings of the existing technology, we have conceived a method that can effectively redirect the direction of the material line in the hopper under the belt. It is a kind of belt hopper chute that can cause the belt to deviate and prevent the material leakage or even crush the belt due to the deviation of the material line.

The belt lower hopper chute is connected under the belt lower hopper, and includes a chute, the top of the chute is connected with the belt lower hopper, and baffles are fixed on both sides of the bottom end of the chute. A conveyor belt is provided, a card slot is fixed on the outer wall of the chute, and a guide plate that extends into the chute and can change the falling point of the material line is inserted into the card slot. There is an included angle between the guide plates; the guide plate is a T-shaped structure, the T-shaped structure includes a transverse part and a longitudinal part connected to the lower end surface of the transverse part, and the longitudinal part of the T-shaped structure is inserted into the chute through the card slot, The transverse part is matched with the clamping groove to be clamped on the outer wall of the chute. [3].

Further, the retaining skin is a sub-arc camber structure. The cambered openings of the baffles on both sides are opposite to each other, forming an approximate circle, and the material that bounces

up after a partial fall can be blocked by the inner arcs of the baffles and fall back to the lower conveyor belt.

Preferably, in order to facilitate processing and at the same time improve the reliability of the guide plate, the transverse portion and the longitudinal portion are integrally formed.

In this design, the guide plate is inserted inward from the groove on the outer wall of the chute, the longitudinal part of the guide plate enters the chute, the material line falls down from the belt hopper, passes through the chute, and is blocked and changed by the guide plate at the guide plate. In a certain direction, the angle between the guide plate and the chute is adjusted by the angle, so that after the material line is blocked by the guide plate and redirected, the drop point of the material line is located in the middle of the conveyor belt, avoiding the deviation of the material line. It also avoids the situation of material leakage or even crushing the belt caused by the deviation of the material line. During this process, the guide plate blocks the material line, which has a deceleration effect on the material line, which prevents the chute from being penetrated and reduces maintenance costs. [4].

The belt feeding hopper chute has a simple structure and reasonable design, which can effectively redirect the direction of the feeding line in the belt feeding hopper, and has a decelerating effect on the feeding line, preventing the chute from being penetrated, reducing maintenance, and avoiding The deviation of the material line causes the belt at the conveyor belt to deviate, and it also avoids the situation of material leakage or even crushing the belt caused by the deviation of the material line.

3. Specific Implementation Cases

In a steel plant, we put it into practice according to the design concept, as follows. A belt lower hopper chute as shown in Figure 1 and Figure 2 is connected under the belt lower hopper, including chute. The top end of the chute is connected with the belt lower hopper, the bottom end of the chute is respectively fixed with baffles on both sides, and a conveyor belt is arranged under the baffles. The retaining skin is a sub-arc camber structure. The cambered openings of the baffles on both sides are opposite to each other, forming an approximate circle, and the material that bounces up after a partial fall can be blocked by the inner arcs of the baffles and fall back to the lower conveyor belt.

A card slot is fixed on the outer wall of the chute, and a guide plate which extends into the chute and can change the falling point of the material line is inserted into the card slot. There is an included angle between the guide plate and the wall of the chute. The included angle is obtained after accurate calculation of the blanking point of the material line, which ensures that the material line can fall in the middle of the belt of the conveyor belt after being redirected by the guide plate. The slot and the outer wall of the chute are fixedly welded to ensure that the angle does not change, and the guide plate is inserted and installed. When the guide plate reaches the wear value, it can be replaced easily and conveniently, just pull out the old guide plate and insert the new guide plate.

The guide plate is a T-shaped structure, and the T-shaped structure includes a transverse part and a longitudinal part connected to the lower end surface of the transverse part. The longitudinal part of the T-shaped structure is inserted into the chute through the card slot, and the transverse part is matched with the card slot to be clamped on the outer wall of the chute.

The belt lower hopper chute designed in this way has a simple structure and a reasonable design. The guide plate is inserted inward from the groove on the outer wall of the chute, the longitudinal part of the guide plate enters the chute, and the material line falls down from the belt hopper, passes through the chute, and is blocked by the guide plate at the guide plate and changes a certain direction. The angle between the guide plate and the chute is adjusted, so that after the material line is blocked and redirected by the guide plate, the drop point of the material line is located in the middle of the conveyor belt, which avoids the deviation of the material line causing the conveyor belt to fall. If the belt is deviated, it also avoids the leakage of material or even crushing the belt caused by the deviation of the material line.

During this process, the guide plate blocks the material line, which has a deceleration effect on the material line, which prevents the chute from being penetrated, reduces the labor intensity of maintenance workers and belt workers, and reduces maintenance costs. At the same time, it can effectively redirect the direction of the material line in the hopper under the belt, which has a deceleration effect on the material line, avoids the piercing of the chute, reduces maintenance, and avoids the deviation of the belt at the conveyor belt caused by the deviation of the material line. , It also avoids the leakage of material or even crushing the belt caused by the offset of the material line.

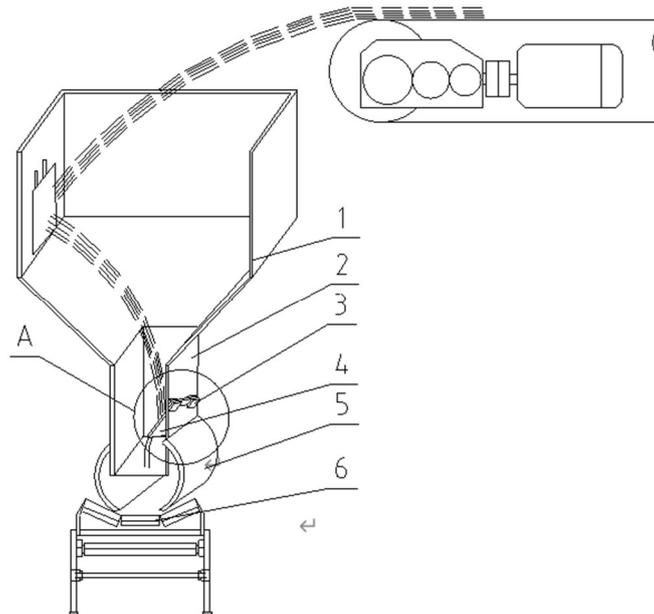


Figure 1. is the structural schematic diagram of the preferred embodiment of the present utility model

In the picture: 1. Belt lowering hopper 2. Chute 3. Card slot 4. Guide plate 5. Baffle 6. Conveyor belt.

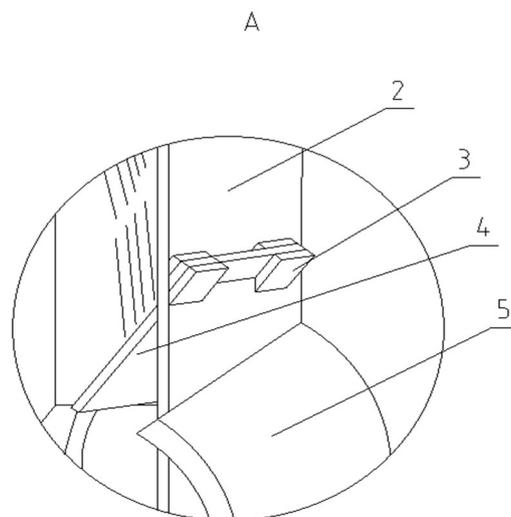


Figure 2. is the enlarged schematic diagram of A in Figure 1

4. Conclusion

We have conceived a method that can effectively redirect the direction of the material line in the hopper under the belt, reduce the speed of the material line and avoid breaking through the chute, prevent the belt from deviating due to the deflection of the material line, and prevent A belt lower hopper chute that causes material leakage or even crushes the belt, with simple structure and reasonable design, prevents the chute from being punctured, reduces the labor intensity of maintenance workers and belt workers, and reduces maintenance costs.

References

- [1] Huang Dawei, Li Feng. Modern Hoisting and Transportation Machinery [M]. Beijing: Chemical Industry Press, 2006.
- [2] Yan Yunjin, Ironmaking Machinery. Beijing: Metallurgical Industry Press, 2001.
- [3] Wang Ping, Ironmaking Machinery. Beijing: Metallurgical Industry Press, 1997.
- [4] Song Weigang, Design of Universal Belt Conveyor [M]. Beijing: Machinery Industry Press, 2006.