

DOUBLE-CHUTE CONCRETE FEEDING DEVICE

Technical Field

5

The present invention relates to a mechanical apparatus for conveying building materials, and in particular to a concrete feeding device.

Technical Background

10

Conventionally, concrete used in building structures is usually mixed in a concrete mixing plant, and then transported to a concrete feeding device which is arranged at a construction site or a factory for manufacturing concrete precast members. By means of the concrete feeding device, concrete is poured directly into parts of the building structures to be cast, or injected into material carriers by which the concrete is further transported to its desirable destination.

However, such traditional concrete feeding device is usually provided with only one hopper. When concrete in the hopper is used out, the hopper must wait for fresh supply of concrete before further operation. If a large amount of concrete is required within a certain period of time, this traditional concrete feeding device cannot feed sufficient amount of concrete in time, which will undoubtedly slow down the construction progress. If the hopper is configured with a relatively large volume, residual concrete in the hopper will solidify and thus cannot be used when only a small amount of concrete is required, resulting in material waste and cost increase.

Summary of the Invention

The technical problem to be solved by the present invention is to provide a

double-chute concrete feeding device, by which one or two hoppers can be supplied concrete depending on the demand for concrete.

To this end, the present invention proposes a double-chute concrete feeding
5 device, comprising: two hoppers, including a right one and a left one; two guiding
chutes, including a right one and a left one, arranged above the hoppers; a receiving
opening arranged above the guiding chutes for receiving materials; and a rotating
mechanism for driving the guiding chutes in rotation. One of the guiding chutes is
provided in a lower part thereof with a discharging outlet, which is arranged vertically
10 above a top opening of one of the hoppers in position, and another of the guiding
chutes is provided in a lower part thereof with two discharging outlets, which are
arranged vertically above the top openings of the two hoppers in position, respectively.
The rotating mechanism is configured to drive the guiding chutes in rotation, so that
the materials enter the guiding chutes via the receiving port and fall into the hoppers
15 through the discharging outlets of the guiding chutes.

The rotating mechanism comprises a first rotating assembly for rotating a left
guiding chute, and a second rotating assembly for rotating a right guiding chute.

20 The first rotating assembly includes a first cylinder, a first connecting rod and a
first rotating shaft, wherein the first connecting rod has an end rotatably connected to
the first cylinder and another end fixedly connected to the first rotating shaft, and the
first cylinder drives the first rotating shaft and the left guiding chute to rotate through
the first connecting rod. The second rotating assembly includes a second cylinder, a
25 second connecting rod and a second rotating shaft, wherein the second connecting rod
has an end rotatably connected to the second cylinder and another end fixedly
connected to the second rotating shaft, and the second cylinder drives the second
rotating shaft and the right guiding chute fixedly connected to the second rotating
shaft to rotate through the second connecting rod.

A first support plate is fixedly connected to a middle part of the first rotating shaft, so that a bottom of the left guiding chute is supported on and fixed to the first support plate. A second support plate is fixedly connected to a middle part of the
5 second rotating shaft, so that a bottom of the right guiding chute is supported on and fixed to the second support plate.

The left guiding chute is provided, at least on its right side, with a discharging outlet arranged vertically above the top opening of the left hopper in position, wherein
10 the left guiding chute is in a horizontal gesture when the first cylinder is fully retracted at its initial position, and turns to the right when the first cylinder is extended. The right guiding chute is provided with a right and a left discharging outlets arranged vertically above the top openings of the two hopper in position, respectively, wherein the right guiding chute is in a horizontal gesture when the second cylinder is extended
15 halfway at its initial position, and turns to the left when the second cylinder is extended from the initial position but turns to the right when the second cylinder is retracted therefrom.

Two receiving ports, including a right one and a left one, are provided
20 corresponding to the right and left guiding chutes, respectively.

The discharging outlets of each of the guiding chutes are located on a lower side wall thereof, and higher than a bottom surface of said guiding chute when said guiding chute is in a horizontal gesture, wherein each of the discharging outlets meets
25 a bottom surface of said guiding chute through an inclined surface.

Compared with the prior arts, the double-chute concrete feeding device according to the present invention is provided with two guiding chutes, which can be controlled by the rotating mechanism to rotate, so that concrete can be supplied into

both hoppers at the same time, or only one of the hoppers according to the demand for concrete. Accordingly, it can ensure timely supply of concrete, thus avoid interruption of supply of concrete to slow down the construction progress. Moreover, it can avoid the waste of concrete, which is conducive to saving time and material costs.

5

Brief Description of the Drawings

Fig. 1 is an elevation view of a double-chute concrete feeding device according to the present invention.

10

Fig. 2 schematically shows a perspective view of the double-chute concrete feeding device according to the present invention.

Fig. 3 is an elevation view showing receiving ports, guiding chutes and a rotating mechanism associated therewith.

15

Fig. 4 schematically shows a perspective view of a first rotating assembly.

Fig. 5 schematically shows a perspective view of a first rotating assembly.

20

Detailed Description of the Invention

In the following, preferred embodiments of the present invention will be further illustrated with reference to the accompany drawings.

25

As shown in Figs. 1 and 2, a double-chute concrete feeding device according to the present invention comprises hopper 1, receiving port 2, guiding chute 3, and a rotating mechanism for driving said guiding chute 3 in rotation. Two hoppers 1, two receiving ports 2 and two guiding chutes 3 are provided, each including a right one

and a left one, wherein said two receiving ports 2, said two guiding chutes 3 and the rotating mechanism are all mounted on a frame 5 and located above said two hoppers 1.

5 As shown in Fig. 2, the receiving ports 2 are mounted uppermost, and each generally have a funnel shape with a large top and a small bottom for receiving and guiding materials, such as concrete. Each receiving port 2 has a top opening for receiving materials, and a bottom opening for discharging materials.

10 As shown in Fig. 2 and Fig. 3, the right and left guiding chutes 3 are located below the right and left receiving ports 2, respectively. Each guiding chute 3 has a closed bottom, and a top opening for receiving concrete and other substances falling from the bottom opening of a corresponding receiving port 2. The right and left sides of each guiding chute 3 are each provided at its lower part with a discharging outlet
15 31. In this embodiment, as shown in Fig. 1, the discharging outlet 31 on the right side of the left guiding chute 3 is vertically above the top opening of the left hopper 1 in position, while the discharging outlets 31 on the right and left sides of the right guiding chute 3 are vertically above the top openings of the right and left hoppers 1 in position, respectively.

20 Materials, such as concrete, enter the guiding chutes 3 through the receiving ports 2. The rotating mechanism drives the guiding chutes 3 to rotate, so that the materials fall into the hoppers 1 arranged below along the discharging outlets 31 of the guiding chutes 3.

25 In this embodiment, each of the guiding chutes 3 generally has a shape of trapezoid in its lower part, which is symmetrical with its center and has a small top and a large bottom. The right and left discharging outlets 31 are located on the lower side walls of the trapezoid part, respectively. Each of the guiding chutes 3 has a

bottom surface, which, in its initial position, is oriented horizontally and lower than the corresponding discharging outlet 31. Each of the discharging outlets 31 meets the bottom surface of the guiding chute 3 through a sloping surface. With this structure, it ensures that concrete, concrete slurry and other residues inside the guiding chute 3
5 will not fall down when the guiding chute 3 returns to its initially horizontal position.

As shown in Fig. 3, said rotating mechanism includes a first rotating assembly 41 for driving the left guiding chute 3 in rotation, and a second rotating assembly 42 for driving the right guiding chute 3 in rotation.

10

As shown in Figs. 3 and 4, the first rotating assembly 41 includes a first cylinder 411, a first connecting rod 412, a first rotating shaft 413, and a first support plate 414. The first cylinder 411 is fixedly mounted on the frame 5, and provided with a retraction in-place sensor 415 and an extension in-place sensor 416. The first
15 connecting rod 412 has an end rotatably connected to the first cylinder 411, and another end fixedly connected to the first rotating shaft 413. The first rotating shaft 413 is supported by a pair of first bearings 417, including a front one and a rear one, and arranged perpendicular to the first connecting rod 412. The first bearings 417 are both fixed to the frame 5. The first support plate 414 is fixedly connected to a middle
20 part of the first rotating shaft 413, so that the bottom of the left guiding chute 3 is supported on and fixed to the first support plate 414. In this manner, the first cylinder 411 can drive the first rotating shaft 413 and the left guiding chute 3 fixed thereon to turn to the right or left via the first connecting rod 412 when the first cylinder 411 is extended or retracted. When the first cylinder 411 is in a fully-retracted position, i.e.,
25 its initial position, the left guiding chute 3 is in the horizontal gesture, and when the first cylinder 411 is extended, the left guiding chute 3 will turn to the right.

As shown in Figs. 3 and 5, said second rotating assembly 42 includes a second cylinder 421, a second connecting rod 422, a second rotating shaft 423 and a second

support plate 424. The second cylinder 421 is fixedly mounted on the frame 5, and provided with an initial-position in-place sensor 425, a left-turn in-place sensor 426 and a right-turn in-place sensor 427. The second connecting rod 422 has an end rotatably connected to the second cylinder 421, and another end fixedly connected to the second rotating shaft 423. The second rotating shaft 423 is supported by a pair of second bearings 428, including a front one and a rear one, and arranged perpendicular to the second connecting rod 422. The second bearings 428 are both fixed to the frame 5. The second support plate 424 is fixedly connected to a middle part of the second rotating shaft 423, so that the bottom of the right guiding chute 3 is supported on and fixed to the second support plate 424. In this manner, the second cylinder 421 can drive the second rotating shaft 423 and the right guiding chute 3 fixed thereon to turn to the right or left via the second connecting rod 422 when the second cylinder 421 is extended or retracted. When the second cylinder 421 is extended to a middle position, i.e., its initial position, the right guiding chute 3 is in the horizontal gesture. The right guiding chute 3 will turn to the left when the second cylinder 421 is extended from its initial position, and turn to the right when the second cylinder 421 is retracted therefrom.

The double-chute concrete feeding device according to the present invention is operated as follows.

Firstly, the first cylinder 411 is extended to drive the first connecting rod 412 to rotate when concrete is delivered to the receiving port 2 and ready for supply. In the meantime, the left guiding chute 3 turns to the right so that its right discharging outlet 31 is aligned with the top opening of the left hopper 1.

Secondly, the second cylinder 421 drives, from its initial position (i.e., the position detected by the initial-position in-place sensor 425), the second connecting rod 422 in rotation, while the right guiding chute 3 rotates so that the discharging

outlet 31 on one side thereof is aligned with the top opening of a corresponding hopper 1. The right guiding chute 3 may turn to the right or left according to actual needs. When the right guiding chute 3 turns leftward to its destination, the left-turn in-place sensor 426 will output a signal, and when it turns rightward to its destination,
5 the right-turn in-place sensor 427 will output a signal.

Thirdly, materials will be discharged after the first cylinder 411 and the second cylinder 421 both reach their working positions respectively.

10 Finally, after the discharging is completed, the first cylinder 411 is retracted to a position where the retraction in-place sensor 415 will output a signal, and the second cylinder 421 is retracted to a position where the initial-position in-place sensor 425 will output a signal. Then, the discharging is completed.

15 Thus, by means of controlling the right and left guiding chutes 3 to rotate through the first rotating assembly 41 and the second rotating assembly 42, materials such as concrete or the like can be simultaneously discharged to the right and left hoppers 1 respectively. Alternatively, the device can be controlled automatically according to the production needs, so that only one of the receiving ports 2 is allowed
20 to receive the materials, and concrete is supplied to only one of the hoppers 1. For example, when the production line only requires concrete for one hopper 1, the device can be controlled to supply the materials to the left receiving port 2 only, and then concrete is supplied to the left hopper 1.

25 The foregoing only describes preferred embodiments of the present invention, and is not intended to limit the present invention. One skilled in the art can make various changes and modifications on the present invention. Any modifications, equivalent replacements, improvements or the like made within the principles of the present invention shall fall within the scope of protection of the present invention.

CLAIMS

1. A double-chute concrete feeding device, comprising:

two hoppers (1), including a right one and a left one;

5 two guiding chutes (3), including a right one and a left one, arranged above the hoppers (1);

a receiving opening (2) arranged above the guiding chutes (3) for receiving materials; and

a rotating mechanism for driving the guiding chutes (3) in rotation,

10 wherein one of the guiding chutes (3) is provided in a lower part thereof with a discharging outlet (31), which is arranged vertically above a top opening of one of the hoppers (1) in position, and another of the guiding chutes (3) is provided in a lower part thereof with two discharging outlets (31), which are arranged vertically above the top openings of the two hoppers (1) in position, respectively; and

15 the rotating mechanism is configured to drive the guiding chutes (3) in rotation, so that the materials enter the guiding chutes (3) via the receiving port (2) and fall into the hoppers (1) through the discharging outlets (31) of the guiding chutes (3).

2. The double-chute concrete feeding device according to claim 1, characterized

20 in that the rotating mechanism comprises a first rotating assembly (41) for rotating a left guiding chute (3), and a second rotating assembly (42) for rotating a right guiding chute (3).

3. The double-chute concrete feeding device according to claim 2, characterized

25 in that the first rotating assembly (41) includes a first cylinder (411), a first connecting rod (412) and a first rotating shaft (413), wherein the first connecting rod (412) has an end rotatably connected to the first cylinder (411) and another end fixedly connected to the first rotating shaft (413), and the first cylinder (411) drives the first rotating shaft (413) and the left guiding chute (3) to rotate through the first connecting rod

(412); and

the second rotating assembly (42) includes a second cylinder (421), a second connecting rod (422) and a second rotating shaft (423), wherein the second connecting rod (422) has an end rotatably connected to the second cylinder (421) and another end
5 fixedly connected to the second rotating shaft (423), and the second cylinder (421) drives the second rotating shaft (423) and the right guiding chute (3) fixedly connected to the second rotating shaft (423) to rotate through the second connecting rod (422).

10 4. The double-chute concrete feeding device according to claim 3, characterized in that a first support plate (414) is fixedly connected to a middle part of the first rotating shaft (413), so that a bottom of the left guiding chute (3) is supported on and fixed to the first support plate (414); and

a second support plate (424) is fixedly connected to a middle part of the second
15 rotating shaft (423), so that a bottom of the right guiding chute (3) is supported on and fixed to the second support plate (424).

5. The double-chute concrete feeding device according to claim 3, characterized in that the left guiding chute (3) is provided, at least on its right side, with a
20 discharging outlet (31) arranged vertically above the top opening of the left hopper (1) in position, wherein the left guiding chute (3) is in a horizontal gesture when the first cylinder (411) is fully retracted at its initial position, and turns to the right when the first cylinder (411) is extended; and

the right guiding chute (3) is provided with a right and a left discharging outlets
25 (31) arranged vertically above the top openings of the two hopper (1) in position, respectively, wherein the right guiding chute (3) is in a horizontal gesture when the second cylinder (421) is extended halfway at its initial position, and turns to the left when the second cylinder (421) is extended from the initial position but turns to the right when the second cylinder (411) is retracted therefrom.

6. The double-chute concrete feeding device according to any one of claims 1 to 5, characterized in that two receiving ports (2), including a right one and a left one, are provided corresponding to the right and left guiding chutes (3), respectively.

5

7. The double-chute concrete feeding device according to any one of claims 1 to 5, characterized in that the discharging outlets (31) of each of the guiding chutes (3) are located on a lower side wall thereof, and higher than a bottom surface of said guiding chute (3) when said guiding chute (3) is in a horizontal gesture, wherein each
10 of the discharging outlets (31) meets a bottom surface of said guiding chute (3) through an inclined surface.