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(54) **HIGH-SPEED BLISTER CARTONING INTEGRATED MACHINE**

INTEGRIERTE HOCHGESCHWINDIGKEITSKARTONIERMASCHINE FÜR BLISTER

MACHINE INTÉGRÉE D'ENCARTONNAGE BLISTER À GRANDE VITESSE

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## Description

### TECHNICAL FIELD

**[0001]** The present disclosure relates to a machine for packaging a medical article, and in particular, to a high-speed blister cartoning integrated machine.

### BACKGROUND

**[0002]** In pharmaceutical packaging and packaging technological process, and particularly in linkage packaging from blister packaging to cartoning for liquid preparations (prefilled syringes, penicillin bottles, and ampoule bottles), how to realize high-speed integrated linkage operation between the preceding blister packaging machine (for blister forming and packaging) and the following cartoning machine (for blister cartoning) in a relatively compact pharmaceutical packaging workshop has become a technical problem to the current core process in the pharmaceutical packaging industry. According to original solutions, plastic blister supports packaged by a blister packaging machine are conveyed to a hopper of a cartoning machine through a conveyor belt or to a feeding station of the cartoning machine through a conveyor chain. For the former method combined with the conveyor belt and the hopper, the plastic blister supports are conveyed forward by a frictional force of the conveyor belt. In this process, the plastic blister supports have a slipping phenomenon on the conveyor belt. Particularly in the high-speed conveying process, due to the frictional force and inertial slipping, the plastic blister supports cannot accurately enter the feeding region of the hopper in the cartoning machine. Hence, large-scale synchronous linkage integrated packaging cannot be effectively realized. For the latter method using the conveyor chain, the conveyor chain usually uses a synchronous belt as a conveying base material. Stops are equidistantly provided on a surface of the synchronous belt to form the annular conveyor chain. In case of a specification change in the preceding blister packaging, after a production batch and a packaging specification are changed, spacings between the plastic blister supports packaged by the blister packaging machine are not always the same, and the number of trimmed blister plastic supports also changes with an actual size of medicines, such that the whole conveyor chain is to be replaced. Moreover, the conventional conveyor chain using the synchronous belt that is difficult to be replaced needs to be calibrated for its origin in each replacement. This is inconvenient for the large-scale synchronous integrated linkage production in the pharmaceutical packaging and hardly adaptable to the integrated linkage packaging technological process in the whole pharmaceutical industry. CN113023003A discloses a full-automatic pre-filled injector packaging production line which comprises a bubble cap packaging machine and a boxing machine; the bubble cap packaging machine is provided with a feeding

station and a bubble cap output station; the boxing machine is provided with a boxing conveying chain used for conveying materials to be boxed, and positioning clamps are evenly distributed on the boxing conveying chain; the full-automatic pre-filled injector packaging production line further comprises a pre-filled injector feeding device which is connected with the feeding station and used for placing pre-filled injectors into empty bubble caps, and a relay device arranged between the bubble cap packaging machine and the boxing machine; and the relay device is used for picking up finished bubble cap plates on the bubble cap output station, adjusting the distance between the finished bubble cap plates and then transferring the finished bubble cap plates to the boxing conveying chain. US2021/268714A1 discloses a molding device including a pitch changing device.

### SUMMARY

**[0003]** In view of shortages in the prior art, the present disclosure provides a high-speed blister cartoning integrated machine capable of being compatible with blisters of different specifications.

**[0004]** A high-speed blister cartoning integrated machine includes a blister packaging machine and a cartoning machine, where the blister packaging machine includes a blister trimming device and a discharging grid conveyor device, wherein packaged blisters trimmed by the blister trimming device are placed into the discharging grid conveyor device and then conveyed out by the discharging grid conveyor device; the cartoning machine includes a feeding grid conveyor device, wherein the packaged blisters are placed onto the feeding grid conveyor device, and conveyed by the feeding grid conveyor device to a cartoning station of the cartoning machine for cartoning; a synchronous spacing-changing conveyor device is provided in front of the discharging grid conveyor device; the synchronous spacing-changing conveyor device is provided side by side with the feeding grid conveyor device; a blister discharging transfer manipulator for transferring packaged blisters on the discharging grid conveyor device to the synchronous spacing-changing conveyor device is provided above the discharging grid conveyor device; the blister discharging transfer manipulator includes a discharging vacuum nozzle; a blister feeding transfer manipulator for transferring packaged blisters on the synchronous spacing-changing conveyor device to the feeding grid conveyor device is provided above the feeding grid conveyor device; the blister feeding transfer manipulator includes a feeding vacuum nozzle; the synchronous spacing-changing conveyor device includes a base; a first slideway and a second slideway are provided side by side on the base; a plurality of first sliding seats are slidably provided on the first slideway; a first tray is provided on each of the first sliding seats; a plurality of second sliding seats are slidably provided on the second slideway; a second tray is provided on each of the second sliding seats; the first

sliding seat is connected to a hinge shaft with a rotation axis provided on the first sliding seat; two cross-connecting rods are hinged crosswise on the hinge shaft; the second sliding seat is connected to a hinge shaft with a rotation axis provided on the second sliding seat; two cross-connecting rods are hinged crosswise on the hinge shaft; cross-connecting rods on two adjacent first sliding seat and second sliding seat are hinged crosswise in one-to-one correspondence; one of the first sliding seats is connected to a first transmission belt; the first transmission belt is in transmission connection with a first power source; one of the second sliding seats is connected to a second transmission belt; and the second transmission belt is in transmission connection with a second power source.

**[0005]** Preferably, a first supporting seat is provided on the first sliding seat; the first tray is provided on the first supporting seat; a first locating pin is provided on the first supporting seat; a first locating hole for allowing the first locating pin to insert into is formed in the first tray; a second supporting seat is provided on the second sliding seat; the second tray is provided on the second supporting seat; a second locating pin is provided on the second supporting seat; and a second locating hole for allowing the second locating pin to insert into is formed in the second tray.

**[0006]** Preferably, a first locating fixture is provided on the first supporting seat; a first locating groove for allowing the first locating fixture to enter is formed at a bottom of the first tray; a second locating fixture is provided on the second supporting seat; and a second locating groove for allowing the second locating fixture to enter is formed at a bottom of the second tray.

**[0007]** Preferably, the feeding grid conveyor device includes a conveyor rack, a grid plate, first pushing plates, a first pushing plate transmission mechanism, and a pushing power source; the grid plate is provided with a feeding channel; the first pushing plates each are provided with a pushing portion capable of being located in the feeding channel; the first pushing plate transmission mechanism includes a first conveyor belt; the first pushing plates are connected to the first conveyor belt; the first conveyor belt is in transmission connection with the pushing power source; the feeding grid conveyor device includes second pushing plates and a second pushing plate transmission mechanism; the second pushing plates and the first pushing plates are arranged at intervals; the second pushing plates each are provided with a pushing portion capable of being located in the feeding channel; the second pushing plate transmission mechanism includes a second conveyor belt; the second conveyor belt is provided side by side with the first conveyor belt; the second pushing plates are connected to the second conveyor belt; and the second conveyor belt is in transmission connection with the pushing power source. During operation, the packaged blisters trimmed by the blister trimming device fall into the feeding channel of the grid plate; the pushing power source drives the first con-

veyor belt and the second conveyor belt to move; since the first pushing plates are connected to the first conveyor belt, the first conveyor belt drives the first pushing plates to move, and the pushing portions of the first pushing plates push the blisters to move forward; and similarly since the second pushing plates are connected to the second conveyor belt, the second conveyor belt drives the second pushing plates to move, and the pushing portions of the second pushing plates push the blisters to move forward.

**[0008]** Preferably, an end of each of the second pushing plates and the first pushing plates is connected to a roller, and a roller walkway for allowing the roller to walk is provided on the conveyor rack, wherein while the pushing plates move, the rollers walk on the roller walkway of the conveyor rack to support the pushing plates.

**[0009]** Preferably, the discharging vacuum nozzle of the blister discharging transfer manipulator is provided on a rotating power source.

**[0010]** Preferably, the blister trimming device is located above the discharging grid conveyor device; the blister trimming device includes a mounting rack, a concave trimming die, a convex trimming die, and a trimming power source; the convex trimming die is provided on the mounting rack; the concave trimming die is located below the convex trimming die; the concave trimming die is connected to a die supporting plate for driving the concave trimming die to move up and down; the die supporting plate is connected to a lower end of a lifting guide post; the lifting guide post is slidably provided on the mounting rack; an upper end of the lifting guide post is connected to a lifting seat; the lifting seat is in transmission connection with the trimming power source, wherein with the trimming power source, the lifting seat drives the die supporting plate through the lifting guide post to move up and down; the concave trimming die connected to the die supporting plate also moves up and down; the concave trimming die is clamped with the convex trimming die for trimming when moving up; the concave trimming die is split with the convex trimming die when moving down; a vertical slideway is provided on the mounting rack; a sliding plate is slidably provided on the vertical slideway; the sliding plate is in transmission connection with a blanking power source for driving the sliding plate to move up and down on the vertical slideway; the sliding plate is connected to a vacuum absorption die; a vacuum suction rod is provided on the vacuum absorption die; the convex trimming die is provided with a convex die hole for allowing the vacuum suction rod to pass through; the concave trimming die is provided with a concave die hole for allowing the convex trimming die to enter and allowing the vacuum suction rod to pass through; and the die supporting plate is provided with a supporting plate hole for allowing the vacuum suction rod to pass through, wherein in response to trimming of the concave trimming die and the convex trimming die, the vacuum suction rod sucks the blister; upon completion of the trimming of the concave trimming die and the convex trim-

ming die, the blanking power source drives the sliding plate to move down, so that the vacuum suction rod takes the blister to pass through the concave die hole of the concave trimming die and the supporting plate hole of the die supporting plate, and places the blister onto the discharging grid conveyor device thereunder.

**[0011]** Preferably, the convex trimming die is connected to a die clamping guide post; the concave trimming die is connected to a guide sleeve; the die clamping guide post is located in the guide sleeve; a lower locking member is provided at one side of the concave trimming die; the lower locking member is provided with a locking groove; and a side edge of the concave trimming die and a side edge of the die supporting plate are located in the locking groove of the lower locking member.

**[0012]** Preferably, a horizontal clamping groove is formed in the mounting rack; a side edge of the convex trimming die can enter the horizontal clamping groove of the mounting rack; the horizontal clamping groove is provided with an upper locking member; an upper bolt is provided on the mounting rack; the upper bolt is threadedly connected to the upper locking member; and the upper locking member can fix the convex trimming die in the horizontal clamping groove.

**[0013]** Preferably, the trimming power source is in transmission connection with an eccentric shaft; an eccentric portion of the eccentric shaft is hinged to one end of a connecting rod; the other end of the connecting rod is hinged to a connecting rod shaft; and the connecting rod shaft is hinged to a supporting seat on the lifting seat.

**[0014]** The high-speed blister cartoning integrated machine provided by the present disclosure can greatly improve the linkage production efficiency between the blister packaging machine and the cartoning machine and solves the problem of hard matching between blister packaging and cartoning in a specification change.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0015]**

FIG. 1 is a top view of a whole blister cartoning integrated machine according to the present disclosure; FIG. 2 is a partial schematic view of a blister cartoning integrated machine according to the present disclosure;

FIG. 3 is a partial front view of a blister cartoning integrated machine according to the present disclosure;

FIG. 4 is a stereoscopic view of a synchronous spacing-changing conveyor device;

FIG. 5 is a front view of a synchronous spacing-changing conveyor device;

FIG. 6 is an exploded view of a synchronous spacing-changing conveyor device;

FIG. 7 illustrates a spacing changing process of a synchronous spacing-changing conveyor device (a top view);

FIG. 8 illustrates a spacing changing process of a synchronous spacing-changing conveyor device (an internal structure);

FIG. 9 illustrates a process of blisters from a blister packaging machine to a synchronous spacing-changing conveyor device and then to a cartoning machine;

FIG. 10 is a stereoscopic view of a discharging grid conveyor device;

FIG. 11 is a partial enlarged view of D in FIG. 10;

FIG. 12 illustrates positions of a blister trimming device and a discharging grid conveyor device;

FIG. 13 is a stereoscopic view according to the present disclosure;

FIG. 14 is a section view 1 of a blister trimming device;

FIG. 15 is a section view 2 of a blister trimming device;

FIG. 16 is an internal structural schematic view of a blister trimming device;

FIG. 17 is a rear view of a blister trimming device;

FIG. 18 illustrates a working principle of a blister trimming device;

FIG. 19 is an exploded view of a blister trimming device; and

FIG. 20 is a partial sectional view of a blister trimming device.

## DETAILED DESCRIPTION OF THE EMBODIMENTS

**[0016]** As shown in FIGS. 1-3, a high-speed blister cartoning integrated machine includes blister packaging machine 1 and cartoning machine 5. The blister packaging machine 1 includes blister trimming device 10 and discharging grid conveyor device 11. Packaged blisters C trimmed by the blister trimming device 10 are placed into the discharging grid conveyor device 11 and then conveyed out by the discharging grid conveyor device 11.

**[0017]** The cartoning machine 5 includes feeding grid conveyor device 51. Packaged blisters are placed onto the feeding grid conveyor device 51, and conveyed by the feeding grid conveyor device 51 to a cartoning station of the cartoning machine 5 for cartoning (carton packaging).

**[0018]** The discharging grid conveyor device 11 has a different grid spacing from the feeding grid conveyor device 51. For the sake of matching between the two devices, synchronous spacing-changing conveyor device 3 is provided in front of the discharging grid conveyor device 11. The synchronous spacing-changing conveyor device 3 is provided side by side with the feeding grid conveyor device 51. Blister discharging transfer manipulator 2 for transferring blisters on the discharging grid conveyor device 11 to the synchronous spacing-changing conveyor device 3 is provided above the discharging grid conveyor device 11. The blister discharging transfer manipulator 2 includes discharging vacuum nozzle 20. Blister feeding transfer manipulator 4 for transferring blis-

ters on the synchronous spacing-changing conveyor device 3 to the feeding grid conveyor device 51 is provided above the feeding grid conveyor device 51. The blister feeding transfer manipulator 4 includes feeding vacuum nozzle 40.

**[0019]** The high-speed blister cartoning integrated machine has the following working principle: Blisters are conveyed out from the discharging grid conveyor device 11 of the blister packaging machine 1. The blister discharging transfer manipulator 2 sucks the blisters C on the discharging grid conveyor device 11 through the discharging vacuum nozzle 20, and transfers them to the synchronous spacing-changing conveyor device 3. While moving forward, the synchronous spacing-changing conveyor device 3 changes a spacing between the blisters (as shown in FIG. 7), until the spacing is the same as the spacing of the feeding grid conveyor device 51. The blister feeding transfer manipulator 4 sucks the blisters on the synchronous spacing-changing conveyor device 3 through the feeding vacuum nozzle 40 and transfers them to the feeding grid conveyor device 51. The feeding grid conveyor device 51 transfers the blisters to the cartoning station of the cartoning machine 5 for cartoning. With the synchronous spacing-changing conveyor device 3, the present disclosure can greatly improve the linkage production efficiency between the blister packaging machine 1 and the cartoning machine 5 and solves the problem of hard matching between blister packaging and cartoning in a specification change.

**[0020]** Both the blister packaging machine and the cartoning machine are the prior art (refer to the patent application No. 201520906465.3). The blister discharging transfer manipulator is also the prior art (refer to the patent application No. 201910076327.X, in which the structure is the same, but the material to be transferred is different). The blister feeding transfer manipulator is also the prior art (refer to the patent application No. 202120863286.1). The high-speed blister cartoning integrated machine is novel for the synchronous spacing-changing conveyor device and the linkage layout using the synchronous spacing-changing conveyor device.

**[0021]** The following descriptions describe the structure and working principle of the synchronous spacing-changing conveyor device 3.

**[0022]** As shown in FIG. 4, the synchronous spacing-changing conveyor device 3 includes base 30. As shown in FIG. 6, first slideway 301 and second slideway 302 are provided side by side on the base 30. A plurality of first sliding seats 311 are slidably provided on the first slideway 301. First tray 321 (the first tray 321 is provided with a placement groove into which a blister can be placed) is provided on each of the first sliding seats 311. A plurality of second sliding seats 312 are slidably provided on the second slideway 302. Second tray 322 (the second tray 321 is provided with a placement groove into which a blister can be placed) is provided on each of the second sliding seats 312. The first sliding seat 311 is connected to a hinge shaft. Two cross-connecting rods 31 are

hinged crosswise on the hinge shaft. The second sliding seat 312 is also connected to a hinge shaft. Two cross-connecting rods 31 are hinged crosswise on the hinge shaft. Cross-connecting rods 31 on two adjacent first sliding seat 311 and second sliding seat 312 are hinged crosswise in one-to-one correspondence (to form a scissor-type structure). One of the first sliding seats 311 is connected to first transmission belt 351. The first transmission belt 351 is in transmission connection with first power source 361. One of the second sliding seats 312 is connected to second transmission belt 352. As shown in FIG. 4, the second transmission belt 352 is in transmission connection with second power source 362.

**[0023]** The synchronous spacing-changing conveyor device 3 has the following working principle: As shown in FIG. 7 and FIG. 8, after blisters are placed onto the first tray 321 and the second tray 322, the first power source 361 drives the first transmission belt 351 to rotate. Since one of the first sliding seats 311 is connected to the first transmission belt 351, the first sliding seats 311 move on the first slideway 301. Likewise, the second power source 362 drives the second transmission belt 352 to rotate. Since one of the second sliding seats 312 is connected to the second transmission belt 351, the second sliding seats 312 move on the second slideway 302. The first sliding seats 311 are connected to the second sliding seats 312 through the cross-connecting rods 31, so all of the first sliding seats 311 and all of the second sliding seats 312 move. Meanwhile, by adjusting the outputs of the power sources, a certain difference is kept between a transfer speed of the first transmission belt 351 and a transfer speed of the second transmission belt 351, and thus spacings between two adjacent ones of the first sliding seats 311 and the second sliding seats 312 change equidistantly, as shown in FIG. 8. The blisters have the same spacing as the following feeding grid conveyor device 5. After the blisters on the trays are taken away, the transmission belts move reversely, and the sliding seats are restored quickly for the next receiving. The above process is repeated. With the synchronous spacing-changing conveyor device 3, the preceding discharging grid conveyor device 11 can be matched with the following feeding grid conveyor device 5, no matter how the specification of the discharging grid conveyor device changes.

**[0024]** For the blisters of different specifications, different trays are required. For the convenience of replacement of the trays to place the blisters of different specifications, as shown in FIG. 6, first supporting seat 331 is provided on the first sliding seat 311. The first tray 321 is provided on the first supporting seat 331. First locating pin 371 is provided on the first supporting seat 331. A first locating hole for allowing the first locating pin 371 to insert into is formed in the first tray 321. When the first tray 321 is replaced necessarily, the first locating pin 371 is pulled out, and the first tray 321 is taken down, which is very convenient. Likewise, second supporting seat is provided on the second sliding seat 312. The second tray

is provided on the second supporting seat. A second locating pin is provided on the second supporting seat. A second locating hole for allowing the second locating pin to insert into is formed in the second tray. When the second tray is replaced necessarily, the second locating pin is pulled out, and the second tray is taken down, which is very convenient.

**[0025]** To avoid rotation of the trays, first locating fixture 341 is provided on the first supporting seat 331. A first locating groove for allowing the first locating fixture 341 to enter is formed at a bottom of the first tray 321. The first supporting seat 331 is clamped onto the first locating fixture 341 through the first locating groove, thereby preventing the rotation of the first tray 321. Likewise, the second supporting seat is connected to a second locating fixture. A second locating groove for allowing the second locating fixture to enter is formed at a bottom of the second tray 322. The second tray 322 is clamped onto the second locating fixture through the second locating groove, thereby preventing the rotation of the second tray 322.

**[0026]** The discharging grid conveyor device 11 of the blister packaging machine may use a common grid conveyor device. However, the present disclosure provides a novel grid conveyor device. As shown in FIG. 10 and FIG. 11, the discharging grid conveyor device 11 includes conveyor rack A10, grid plate A15, first pushing plates A11, a first pushing plate transmission mechanism, and pushing power source A19. The grid plate A15 is provided with feeding channel A150. The first pushing plates A11 each are provided with pushing portion A110 capable of being located in the feeding channel A150. The first pushing plate transmission mechanism includes first conveyor belt A13. The first pushing plates A11 are connected to the first conveyor belt A13. The first conveyor belt A13 is in transmission connection with the pushing power source A19. During operation, trimmed blisters C fall into the feeding channel A150 of the grid plate A15. The pushing power source A19 drives the first conveyor belt A13 to move. Since the first pushing plates A11 are connected to the first conveyor belt A13, the first conveyor belt A13 drives the first pushing plates A11 to move, and the pushing portions A110 of the first pushing plates A11 push the blisters C to move forward.

**[0027]** For the blisters of different specifications, the grid spacing of the discharging grid conveyor device 11 can also be adjusted as required, so as to realize a most efficient output. The discharging grid conveyor device 11 in the present disclosure further includes second pushing plates A12 and a second pushing plate transmission mechanism. The second pushing plates A12 and the first pushing plates A11 are arranged at intervals. The second pushing plates A12 each are provided with a pushing portion located in the feeding channel A150. The second pushing plate transmission mechanism includes second conveyor belt A14. The second conveyor belt A14 is provided side by side with the first conveyor belt A13. The second pushing plates A12 are connected to the second

conveyor belt A14. The second conveyor belt A14 is in transmission connection with the pushing power source A19. The second pushing plate A12 has the same pushing principle as the first pushing plate A11, which is not repeated herein. When the grid spacing is adjusted necessarily, either or both of the first conveyor belt A13 and the second conveyor belt A14 are adjusted to change a spacing between the first pushing plate A11 and the second pushing plate A12, thereby conveying the blisters of the different specifications.

**[0028]** To support the pushing plates, an end of each of the second pushing plates A12 and the first pushing plates A11 is connected to roller A16. Roller walkway A17 for allowing the roller A16 to walk is provided on the conveyor rack A10. While the pushing plates move, the rollers A16 walk on the roller walkway A17 of the conveyor rack A10, thereby supporting the pushing plates and making the pushing plates walk more stably.

**[0029]** As shown in FIG. 9, the discharging vacuum nozzle 20 of the blister discharging transfer manipulator 2 is provided on a rotating power source, such that the blisters from the discharging grid conveyor device 11 to the synchronous spacing-changing conveyor device 3 are rotated by 90°, and the transverse blisters are placed longitudinally to meet requirements on cartoning positions. With the rotating power source, the discharging vacuum nozzle 20 is rotated by 90° in movement. The manipulator is rotated when there are many blisters in a longitudinal direction. In case of a small number of blisters in the longitudinal direction, the manipulator is unnecessarily rotated. In addition, the blister feeding transfer manipulator 4 can track blister suction and placement, such that the synchronous spacing-changing conveyor device 3 and the feeding grid conveyor device 51 realize continuous conveyance to improve the packaging efficiency.

**[0030]** As shown in FIG. 12, the blister trimming device 10 continuously trims blisters on a blister card and places the blisters onto the discharging grid conveyor device 11. The blisters are conveyed forward by the discharging grid conveyor device 11.

**[0031]** The existing blister trimming device includes a convex trimming die, a concave trimming die, and a trimming power source. With the trimming power source, the convex trimming die and the concave trimming die are clamped to continuously trim the blisters from the blister card. The blisters fall onto the grid conveyor device and are continuously conveyed forward by the grid conveyor device. However, due to a certain drop between the blister trimming point and the grid conveyor device, the directly falling blisters may be bounced up, and cannot accurately enter grids of the grid conveyor device to affect subsequent normal operation.

**[0032]** In view of the above problem, the present disclosure provides a novel blister trimming device 10. As shown in FIG. 13 and FIG. 14, the novel blister trimming device 10 includes mounting rack B1, concave trimming die B2, convex trimming die B3, and trimming power source B4. The convex trimming die B3 is provided on

the mounting rack B1. The concave trimming die B2 is located below the convex trimming die B3. In order to drive the concave trimming die B2 to move up and down, the concave trimming die B2 is connected to die supporting plate B5. The die supporting plate B5 is connected to a lower end of lifting guide post B6. The lifting guide post B6 is slidably provided on the mounting rack B1. An upper end of the lifting guide post B6 is connected to lifting seat B7. The lifting seat B7 is in transmission connection with the trimming power source B4. With the trimming power source B4, the lifting seat B7 drives the die supporting plate B5 through the lifting guide post B6 to move up and down. The concave trimming die B2 connected to the die supporting plate B5 also moves up and down. The concave trimming die B2 is clamped with the convex trimming die B3 for trimming when moving up. The concave trimming die B2 is split with the convex trimming die B3 when moving down.

**[0033]** As shown in FIG. 15 and FIG. 16, vertical slideway B8 is provided on the mounting rack B1. Sliding plate B9 is slidably provided on the vertical slideway B8. The sliding plate B9 is in transmission connection with blanking power source B10 for driving the sliding plate B9 to move on the vertical slideway B8. With the blanking power source B10, the sliding plate B9 moves up and down. The sliding plate B9 is connected to vacuum absorption die B11 (the vacuum absorption die B11 is the prior art). Vacuum suction rod B12 is provided on the vacuum absorption die B11 (a gas path is provided in the vacuum absorption die B11. The vacuum suction rod B12 is connected to the gas path). The convex trimming die B3 is provided with convex die hole B30 for allowing the vacuum suction rod B12 to pass through (only in this way can a blister be sucked from a front side). The concave trimming die B2 is provided with concave die hole B20 for allowing the convex trimming die B3 to enter and allowing the vacuum suction rod B12 to pass through. The die supporting plate B5 is provided with supporting plate hole B50 for allowing the vacuum suction rod B12 to pass through. As shown in FIG. 18, in response to trimming of the concave trimming die B2 and the convex trimming die B3, the vacuum suction rod B12 sucks the blister. Upon completion of the trimming of the concave trimming die B2 and the convex trimming die B3, the blanking power source B10 drives the sliding plate B9 to move down. In this way, the vacuum suction rod B12 takes along the blister to pass through the concave die hole B20 of the concave trimming die B2 and the supporting plate hole B50 of the die supporting plate B5, and places the blister onto the discharging grid conveyor device 11 thereunder. Since the vacuum suction rod B12 sucks the blister and places it down, the blister can stably enter a grid of the discharging grid conveyor device 11.

**[0034]** For the sake of the accurate die clamping, the convex trimming die B3 is connected to die clamping guide post B34. The concave trimming die B2 is connected to guide sleeve B25. The die clamping guide post B34 is located in the guide sleeve B25. Under the guidance

of the die clamping guide post B34, the concave trimming die B2 and the convex trimming die B3 can be clamped accurately. The concave trimming die B2 is further connected to the die supporting plate B5 (the die supporting plate B5 drives the concave trimming die B2 to move up and down). For the concave trimming die B2 to be connected to the die supporting plate B5, and the concave trimming die B2 moves horizontally relative to the die supporting plate B5 (to ensure that the concave trimming die B2 moves up and down along the die clamping guide post B34, a common connection between the concave trimming die B2 and the die supporting plate B5 hardly realizes the accuracy for a mounting position of the concave trimming die B2 and thus the concave trimming die B2 must have a horizontal moving space), lower locking member B21 is provided at one side of the concave trimming die B2, as shown in FIG. 19 and FIG. 20. The lower locking member B21 is provided with a locking groove. A side edge of the concave trimming die B2 and a side edge of the die supporting plate B5 are located in the locking groove of the lower locking member B21 (the lower locking member B21 may be connected to the die supporting plate B5 or the concave trimming die B2 through a bolt. Certainly, the bolt may also be used unnecessarily). By locking the concave trimming die B2 and the die supporting plate B5 with the lower locking member B21, the moving die supporting plate B5 can drive the concave trimming die B2 to move up and down. Meanwhile, the concave trimming die B2 can move slightly in a horizontal direction in the locking groove of the lower locking member B21, which ensures that the concave trimming die B2 is not limited completely in the horizontal direction. Therefore, the concave trimming die B2 has a self-adjusting space when moving along the die clamping guide post B34 up and down.

**[0035]** As shown in FIG. 19, the concave trimming die B2 is connected to the die supporting plate B5. For the sake of quick location of the concave trimming die B2 on the die supporting plate B5, locating member B51 is provided on the die supporting plate B5. A locating groove for allowing the locating member B51 to enter is formed at one side of the concave trimming die B2. When the concave trimming die B2 is placed onto the die supporting plate B5, the locating member B51 may enter the locating groove of the concave trimming die B2. In this way, the concave trimming die B2 is basically determined, and then the lower locking member B21 is locked.

**[0036]** For the convenience of die replacement, the convex trimming die B3 is detachably provided on the mounting rack B1. When the dies are taken out necessarily, the convex trimming die B3 is detached, and the lower locking member B21 is taken down. Therefore, the concave trimming die B2 and the convex trimming die B3 can be taken out together.

**[0037]** In order to take out the dies conveniently, as shown in FIG. 19 and FIG. 20, die taking tool B22 is provided at one side of the convex trimming die B3. The die taking tool B22 includes a die taking plate and a handle.

The handle is connected to the die taking plate. The die taking plate may be threadedly connected to the concave trimming die B2 and the convex trimming die B3 through a die taking bolt. When the dies are taken out necessarily, while the unlocking is ensured, the die taking plate is connected to the concave trimming die B2 and the convex trimming die B3 through the bolt, and the handle is pulled. Therefore, the concave trimming die B2 and the convex trimming die B3 can be drawn out together, which is very convenient.

**[0038]** As described above, the convex trimming die B3 is detachably provided on the mounting rack B1. In order to provide the convex trimming die B3 conveniently, horizontal clamping groove B31 is formed in the mounting rack B1. A side edge of the convex trimming die B3 may enter the horizontal clamping groove B31 of the mounting rack B1. The convex trimming die B3 is locked with the mounting rack B1 through a bolt. The horizontal clamping groove B31 is also convenient to draw out the convex trimming die B3.

**[0039]** As shown in FIG. 19, in order to quickly lock the convex trimming die B3 on the mounting rack B1, the horizontal clamping groove B31 is provided with upper locking member B33. Upper bolt B32 is provided on the mounting rack B1. The upper bolt B32 is threadedly connected to the upper locking member B33. By screwing up the upper bolt B32, the upper locking member B33 can fix the convex trimming die B3 in the horizontal clamping groove B31. When the convex trimming die B3 is taken out necessarily, the upper bolt B32 is screwed down, which is very convenient.

**[0040]** As shown in FIG. 14, in order to drive the lifting seat B7 to lift, the trimming power source B4 is in transmission connection with eccentric shaft B13. An eccentric portion of the eccentric shaft B13 is hinged to one end of connecting rod B14. The other end of the connecting rod B14 is hinged to connecting rod shaft B15. The connecting rod shaft B15 is hinged to supporting seat B70 on the lifting seat B7. During operation, the trimming power source B4 drives the eccentric shaft B13 to rotate. The eccentric portion of the eccentric shaft B13 drives the connecting rod B14 to move up and down. The connecting rod B14 further drives the lifting seat B7 through the connecting rod shaft B15 to move up and down. Therefore, the concave trimming die B2 moves up and down. Certainly, there are many structures through which the trimming power source B4 drives the lifting seat B7 to lift. For example, the structure with a crank connecting rod, or other existing transmission structures like a cam transmission structure all fall within the protection scope of the present disclosure.

**[0041]** In order to drive the sliding plate B9 to move up and down, the blanking power source B10 is in transmission connection with the sliding plate B9 through crank connecting rod B16. Likewise, there are many structures through which the blanking power source B10 drives the sliding plate B9 to move up and down. For example, existing transmission structures like a cam transmission

structure all fall within the protection scope of the present disclosure.

**[0042]** Finally, as shown in FIG. 17, in order to conveniently adjust the trimming device, sliding locating beam B17 is provided on the mounting rack B1. The sliding locating beam B17 is slidably provided on horizontal slideway B19 of housing plate B18 (the housing plate B18 is provided on the blister packaging machine). Adjusting threaded rod B180 is rotatably provided on the housing plate B18. A nut is provided on the sliding locating beam B17. The nut is threadedly connected to the adjusting threaded rod B180. During adjustment, the adjusting threaded rod B180 is rotated. The sliding locating beam B17 of the mounting rack B1 moves on the horizontal slideway B19 of the housing plate B18. With a horizontal movement on the mounting rack B1, the whole blister trimming device can be adjusted.

## Claims

1. A high-speed blister cartoning integrated machine, comprising a blister packaging machine (1) and a cartoning machine (5), wherein the blister packaging machine (1) comprises a blister trimming device (10) and a discharging grid conveyor device (11), wherein packaged blisters (C) trimmed by the blister trimming device (10) are placed into the discharging grid conveyor device (11) and then conveyed out by the discharging grid conveyor device (11); the cartoning machine (5) comprises a feeding grid conveyor device (51), wherein the packaged blisters (C) are placed onto the feeding grid conveyor device (51), and conveyed by the feeding grid conveyor device (51) to a cartooning station of the cartoning machine (5) for cartoning; a synchronous spacing-changing conveyor device (3) is provided in front of the discharging grid conveyor device (11); the synchronous spacing-changing conveyor device (3) is provided side by side with the feeding grid conveyor device (51); a blister discharging transfer manipulator (2) for transferring packaged blisters (C) on the discharging grid conveyor device (11) to the synchronous spacing-changing conveyor device (3) is provided above the discharging grid conveyor device (11); the blister discharging transfer manipulator (2) comprises a discharging vacuum nozzle (20); a blister feeding transfer manipulator (4) for transferring packaged blisters (C) on the synchronous spacing-changing conveyor device (3) to the feeding grid conveyor device (51) is provided above the feeding grid conveyor device (51); the blister feeding transfer manipulator (4) comprises a feeding vacuum nozzle (40); **characterized in that** the synchronous spacing-changing conveyor device (3) comprises a base (30); a first slideway (301) and a second slideway (302) are provided side by side on the base (30); a plurality of first sliding seats (311) are slidably pro-

vided on the first slideway (301); a first tray (321) is provided on each of the first sliding seats (311); a plurality of second sliding seats (312) are slidably provided on the second slideway (302); a second tray (322) is provided on each of the second sliding seats (312); the first sliding seat (311) is connected to a hinge shaft with a rotation axis provided on the first sliding seat (311); two cross-connecting rods (31) are hinged crosswise on the hinge shaft; the second sliding seat (312) is connected to a hinge shaft with a rotation axis provided on the second sliding seat (312); two cross-connecting rods (31) are hinged crosswise on the hinge shaft; cross-connecting rods (31) on two adjacent first sliding seat (311) and second sliding seat (312) are hinged crosswise in one-to-one correspondence; one of the first sliding seats (311) is connected to a first transmission belt (351); the first transmission belt (351) is in transmission connection with a first power source (361); one of the second sliding seats (312) is connected to a second transmission belt (352); and the second transmission belt (352) is in transmission connection with a second power source (362).

2. The high-speed blister cartoning integrated machine according to claim 1, wherein a first supporting seat (331) is provided on the first sliding seat (311); the first tray (321) is provided on the first supporting seat (331); a first locating pin (371) is provided on the first supporting seat (331); a first locating hole for allowing the first locating pin (371) to insert into is formed in the first tray (321); a second supporting seat is provided on the second sliding seat (312); the second tray is provided on the second supporting seat; a second locating pin is provided on the second supporting seat; and a second locating hole for allowing the second locating pin to insert into is formed in the second tray.
3. The high-speed blister cartoning integrated machine according to claim 2, wherein a first locating fixture (341) is provided on the first supporting seat (331); a first locating groove for allowing the first locating fixture (341) to enter is formed at a bottom of the first tray (321); a second locating fixture is provided on the second supporting seat; and a second locating groove for allowing the second locating fixture to enter is formed at a bottom of the second tray.
4. The high-speed blister cartoning integrated machine according to claim 1, wherein the feeding grid conveyor device (11) comprises a conveyor rack (A10), a grid plate (A15), first pushing plates (A11), a first pushing plate transmission mechanism, and a pushing power source (A19); the grid plate (A15) is provided with a feeding channel (A150); the first pushing plates (A11) each are provided with a pushing portion (A110) capable of being located in the feeding

channel (A150); the first pushing plate transmission mechanism comprises a first conveyor belt (A13); the first pushing plates (A11) are connected to the first conveyor belt (A13); the first conveyor belt (A13) is in transmission connection with the pushing power source (A19); the feeding grid conveyor device (11) comprises second pushing plates (A12) and a second pushing plate transmission mechanism; the second pushing plates (A12) and the first pushing plates (A11) are arranged at intervals; the second pushing plates (A12) each are provided with a pushing portion capable of being located in the feeding channel (A150); the second pushing plate transmission mechanism comprises a second conveyor belt (A14); the second conveyor belt (A14) is provided side by side with the first conveyor belt (A13); the second pushing plates (A12) are connected to the second conveyor belt (A14); and the second conveyor belt (A14) is in transmission connection with the pushing power source (A19); wherein during operation, the packaged blisters (C) trimmed by the blister trimming device (10) fall into the feeding channel (A150) of the grid plate (A15); the pushing power source (A19) drives the first conveyor belt (A13) and the second conveyor belt (A14) to move; since the first pushing plates (A11) are connected to the first conveyor belt (A13), the first conveyor belt (A13) drives the first pushing plates (A11) to move, and the pushing portions (A110) of the first pushing plates (A11) push the blisters (C) to move forward; and similarly since the second pushing plates (A12) are connected to the second conveyor belt (A14), the second conveyor belt (A14) drives the second pushing plates (A12) to move, and the pushing portions of the second pushing plates (A12) push the blisters (C) to move forward.

5. The high-speed blister cartoning integrated machine according to claim 4, wherein an end of each of the second pushing plates (A12) and the first pushing plates (A11) is connected to a roller (A16), and a roller walkway (A17) for allowing the roller (A16) to walk is provided on the conveyor rack (A10), wherein while the pushing plates move, the rollers (A16) walk on the roller walkway (A17) of the conveyor rack (A10) to support the pushing plates.
6. The high-speed blister cartoning integrated machine according to claim 5, wherein the discharging vacuum nozzle (20) of the blister discharging transfer manipulator (2) is provided on a rotating power source.
7. The high-speed blister cartoning integrated machine according to claim 1, wherein the blister trimming device (10) is located above the discharging grid conveyor device (11); the blister trimming device (10) comprises a mounting rack (B1), a concave trimming die (B2), a convex trimming die (B3), and a trimming

power source (B4); the convex trimming die (B3) is provided on the mounting rack (B1); the concave trimming die (B2) is located below the convex trimming die (B3); the concave trimming die (B2) is connected to a die supporting plate (B5) for driving the concave trimming die (B2) to move up and down; the die supporting plate (B5) is connected to a lower end of a lifting guide post (B6); the lifting guide post (B6) is slidably provided on the mounting rack (B1); an upper end of the lifting guide post (B6) is connected to a lifting seat (B7); the lifting seat (B7) is in transmission connection with the trimming power source (B4), wherein with the trimming power source (B4), the lifting seat (B7) drives the die supporting plate (B5) through the lifting guide post (B6) to move up and down; the concave trimming die (B2) connected to the die supporting plate (B5) also moves up and down; the concave trimming die (B2) is clamped with the convex trimming die (B3) for trimming when moving up; the concave trimming die (B2) is split with the convex trimming die (B3) when moving down; a vertical slideway (B8) is provided on the mounting rack (B1); a sliding plate (B9) is slidably provided on the vertical slideway (B8); the sliding plate (B9) is in transmission connection with a blanking power source (B10) for driving the sliding plate (B9) to move up and down on the vertical slideway (B8); the sliding plate (B9) is connected to a vacuum absorption die (B11); a vacuum suction rod (B12) is provided on the vacuum absorption die (B11); the convex trimming die (B3) is provided with a convex die hole (B30) for allowing the vacuum suction rod (B12) to pass through; the concave trimming die (B2) is provided with a concave die hole (B20) for allowing the convex trimming die (B3) to enter and allowing the vacuum suction rod (B12) to pass through; and the die supporting plate (B5) is provided with a supporting plate hole (B50) for allowing the vacuum suction rod (B12) to pass through, wherein in response to trimming of the concave trimming die (B2) and the convex trimming die (B3), the vacuum suction rod (B12) sucks the blister; upon completion of the trimming of the concave trimming die (B2) and the convex trimming die (B3), the blanking power source (B10) drives the sliding plate (B9) to move down, so that the vacuum suction rod (B12) takes the blister to pass through the concave die hole (B20) of the concave trimming die (B2) and the supporting plate hole (B50) of the die supporting plate (B5), and places the blister onto the discharging grid conveyor device (11) thereunder.

8. The high-speed blister cartoning integrated machine according to claim 7, wherein the convex trimming die (B3) is connected to a die clamping guide post (B34); the concave trimming die (B2) is connected to a guide sleeve (B25); the die clamping guide post (B34) is located in the guide sleeve (B25); a lower

locking member (B21) is provided at one side of the concave trimming die (B2); the lower locking member (B21) is provided with a locking groove; and a side edge of the concave trimming die (B2) and a side edge of the die supporting plate (B5) are located in the locking groove of the lower locking member (B21).

9. The high-speed blister cartoning integrated machine according to claim 7, wherein a horizontal clamping groove (B31) is formed in the mounting rack (B1); a side edge of the convex trimming die (B3) enters the horizontal clamping groove (B31) of the mounting rack (B1); the horizontal clamping groove (B31) is provided with an upper locking member (B33); an upper bolt (B32) is provided on the mounting rack (B1); the upper bolt (B32) is threadedly connected to the upper locking member (B33); and the upper locking member (B33) fixes the convex trimming die (B3) in the horizontal clamping groove (B31).
10. The high-speed blister cartoning integrated machine according to claim 7, wherein the trimming power source (B4) is in transmission connection with an eccentric shaft (B13); an eccentric portion of the eccentric shaft (B13) is hinged to one end of a connecting rod (B14); the other end of the connecting rod (B14) is hinged to a connecting rod shaft (B15); and the connecting rod shaft (B15) is hinged to a supporting seat (B70) on the lifting seat (B7).

#### Patentansprüche

1. Eine integrierte Hochgeschwindigkeits-Blister-Kartoniermaschine, bestehend aus einer Blister-Verpackungsmaschine (1) und einer Kartoniermaschine (5), wobei die Blister-Verpackungsmaschine (1) eine Blister-Trimmvorrichtung (10) und eine Austragsgitter-Fördervorrichtung (11) umfasst, wobei verpackte Blister (C), die von der Blister-Trimmvorrichtung (10) zugeschnitten wurden, in der Austragsgitter-Fördervorrichtung (11) platziert und von der Austragsgitter-Fördervorrichtung (11) abgeführt werden; die Kartoniermaschine (5) umfasst eine Zuführgitter-Fördervorrichtung (51), wobei die verpackten Blister (C) auf der Zuführgitter-Fördervorrichtung (51) platziert werden und durch die Zuführgitter-Fördervorrichtung (51) zu einer Kartonierstation der Kartoniermaschine (5) zum Kartonieren befördert werden; eine synchrone Abstandänderungs-Fördervorrichtung (3) befindet sich vor der Austragsgitter-Fördervorrichtung (11); die synchrone Abstandänderungs-Fördervorrichtung (3) ist parallel zur Zuführgitter-Fördervorrichtung (51) angeordnet; ein Blisterabgab-Transfermanipulator (2) zur Übergabe von verpackten Blistern (C) auf der Austragsgitter-Fördervorrichtung (11) an die synchrone Abstandände-

- rungs-Fördervorrichtung (3) ist oberhalb der Austragsgitter-Fördervorrichtung (11) angeordnet; der Blisterabgabe-Transfermanipulator (2) umfasst eine Abgabe-Vakuumdüse (20); ein Blisterzufuhr-Transfermanipulator (4) zur Übergabe verpackter Blister (C) auf der synchronen Abstandänderungs-Fördervorrichtung (3) an die Zuführgitter-Fördervorrichtung (51) ist oberhalb der Zuführgitter-Fördervorrichtung (51) angeordnet; der Blisterzufuhr-Transfermanipulator (4) umfasst eine Zufuhr-Vakuumdüse (40); **dadurch gekennzeichnet, dass** die synchrone Abstandänderungs-Fördervorrichtung (3) eine Basis (30) umfasst; eine erste Gleitbahn (301) und eine zweite Gleitbahn (302) sind nebeneinander auf der Basis (30) angeordnet; mehrere erste Gleitsitze (311) sind gleitend auf der ersten Gleitbahn (301) angeordnet; ein erstes Tablett (321) ist auf jedem der ersten Gleitsitze (311) angeordnet; mehrere zweite Gleitsitze (312) sind gleitend auf der zweiten Gleitbahn (302) angeordnet; ein zweites Tablett (322) ist auf jedem der zweiten Gleitsitze (312) angeordnet; der erste Gleitsitz (311) ist verbunden mit einer Scharnierwelle mit Drehachse, die auf dem ersten Gleitsitz (311) angebracht ist; zwei Querverbindungsstangen (31) sind kreuzweise an der Scharnierwelle angebracht; der zweite Gleitsitz (312) ist verbunden mit einer Scharnierwelle mit Drehachse, die an dem zweiten Gleitsitz (312) angebracht ist; zwei Querverbindungsstangen (31) sind kreuzweise an der Scharnierwelle angebracht; Querverbindungsstangen (31) an einem benachbarten ersten Gleitsitz (311) und zweiten Gleitsitz (312) sind kreuzweise in eins-zu-eins-Entsprechung angebracht; einer der ersten Gleitsitze (311) ist mit einem ersten Transmissionsriemen (351) verbunden; der erste Transmissionsriemen (351) steht in Übertragungsverbindung mit einer ersten Energiequelle (361); einer der zweiten Gleitsitze (312) ist mit einem zweiten Transmissionsriemen (352) verbunden; und der zweite Transmissionsriemen (352) steht in Übertragungsverbindung mit einer zweiten Energiequelle (362).
2. Die integrierte Hochgeschwindigkeits-Blister-Kartonniermaschine nach Anspruch 1, wobei ein erster Stützsitz (331) auf dem ersten Gleitsitz (311) angebracht ist; das erste Tablett (321) ist auf dem ersten Stützsitz (331) angebracht; ein erster Befestigungsstift (371) ist auf dem ersten Stützsitz (331) angebracht; ein erstes Befestigungsloch, in das der erste Befestigungsstift (371) eingeführt werden kann, ist in dem ersten Tablett (321) ausgebildet; ein zweiter Stützsitz ist auf dem zweiten Gleitsitz (312) angebracht; das zweite Tablett ist auf dem zweiten Stützsitz angebracht; ein zweiter Befestigungsstift ist auf dem zweiten Stützsitz angebracht; und ein zweites Befestigungsloch, in das der zweite Befestigungsstift eingeführt werden kann, ist in dem zweiten Ta-
- blett ausgebildet.
3. Die integrierte Hochgeschwindigkeits-Blister-Kartonniermaschine nach Anspruch 2, wobei eine erste Positioniervorrichtung (341) auf dem ersten Stützsitz (331) angebracht ist; eine erste Positioniernut, in die die erste Positioniervorrichtung (341) eintreten kann, ist am Boden des ersten Tablett (321) ausgebildet; eine zweite Positioniervorrichtung ist auf dem zweiten Stützsitz angebracht; und eine zweite Positioniernut, in die die zweite Positioniervorrichtung eintreten kann, ist am Boden des zweiten Tablett ausgebildet.
4. Die integrierte Hochgeschwindigkeits-Blister-Kartonniermaschine nach Anspruch 1, wobei die Austragsgitter-Fördervorrichtung (11) ein Fördergestell (A10), eine Gitterplatte (A15), erste Schiebeplatten (A11), einen ersten Schiebeplatten-Übertragungsmechanismus und eine Schiebe-Energiequelle (A19) umfasst; die Gitterplatte (A15) ist mit einem Zuführkanal (A150) versehen; die ersten Schiebeplatten (A11) sind jeweils mit einem Schiebeteil (A110) versehen, das in den Zuführkanal (A150) eingebracht werden kann; der erste Schiebeplatten-Übertragungsmechanismus umfasst ein erstes Förderband (A13); die ersten Schiebeplatten (A11) sind mit dem ersten Förderband (A13) verbunden; das erste Förderband (A13) steht in Übertragungsverbindung mit der Schiebe-Energiequelle (A19); die Austragsgitter-Fördervorrichtung (11) umfasst zweite Schiebeplatten (A12) und einen zweiten Schiebeplatten-Übertragungsmechanismus; die zweiten Schiebeplatten (A12) und die ersten Schiebeplatten (A11) sind in Intervallen angeordnet; die zweiten Schiebeplatten (A12) sind jeweils mit einem Schiebeteil versehen, das in den Zuführkanal (A150) eingebracht werden kann; der zweite Schiebeplatten-Übertragungsmechanismus umfasst ein zweites Förderband (A14); das zweite Förderband (A14) ist parallel zum ersten Förderband (A13) angeordnet; die zweiten Schiebeplatten (A12) sind mit dem zweiten Förderband (A14) verbunden; und das zweite Förderband (A14) steht in Übertragungsverbindung mit der Schiebe-Energiequelle (A19); wobei während des Betriebs die verpackten Blister (C), die von der Blister-Trimmvorrichtung (10) zugeschnitten wurden, in den Zuführkanal (A150) der Gitterplatte (A15) fallen; die Schiebe-Energiequelle (A19) treibt das erste Förderband (A13) und das zweite Förderband (A14) zur Bewegung an; da die ersten Schiebeplatten (A11) mit dem ersten Förderband (A13) verbunden sind, treibt das erste Förderband (A13) die ersten Schiebeplatten (A11) zur Bewegung an, und die Schiebeteile (A110) der ersten Schiebeplatten (A11) bewegen die Blister (C) vorwärts; und gleichermaßen, da die zweiten Schiebeplatten (A12) mit dem zweiten Förderband (A14) verbunden sind,

treibt das zweite Förderband (A14) die zweiten Schiebeplatten (A12) zur Bewegung an, und die Schiebeteile der zweiten Schiebeplatten (A12) bewegen die Blister (C) vorwärts.

5. Die integrierte Hochgeschwindigkeits-Blister-Kartonniermaschine nach Anspruch 4, wobei ein Ende jeder der zweiten Schiebeplatten (A12) und der ersten Schiebeplatten (A11) mit einer Rolle (A16) verbunden ist, und ein Rollenweg (A17), der die Bewegung der Rolle (A16) ermöglicht, an dem Fördergestell (A10) angeordnet ist, wobei während der Bewegung der Schiebeplatten die Rollen (A16) auf dem Rollenweg (A17) des Fördergestells (A10) laufen, um die Schiebeplatten zu unterstützen.
6. Die integrierte Hochgeschwindigkeits-Blister-Kartonniermaschine nach Anspruch 5, wobei die Abgabe-Vakuumdüse (20) des Blisterabgabe-Transfermanipulators (2) an einer rotierenden Energiequelle angebracht ist.
7. Die integrierte Hochgeschwindigkeits-Blister-Kartonniermaschine nach Anspruch 1, wobei die Blister-Trimmvorrichtung (10) oberhalb der Austragsgitter-Fördervorrichtung (11) angeordnet ist; die Blister-Trimmvorrichtung (10) umfasst ein Montagegestell (B1), eine konkave Schnittmatrize (B2), eine konvexe Schnittmatrize (B3) und eine Trimm-Energiequelle (B4); die konvexe Schnittmatrize (B3) ist auf dem Montagegestell (B1) angebracht; die konkave Schnittmatrize (B2) befindet sich unter der konvexen Schnittmatrize (B3); die konkave Schnittmatrize (B2) ist mit einer Matrizenstützplatte (B5) verbunden, welche die konkave Schnittmatrize (B2) nach oben und unten bewegt; die Matrizenstützplatte (B5) ist mit dem unteren Ende einer Hubführungssäule (B6) verbunden; die Hubführungssäule (B6) ist gleitend auf dem Montagegestell (B1) angeordnet; ein oberes Ende der Hubführungssäule (B6) ist mit einem Hubstift (B7) verbunden; der Hubstift (B7) steht in Übertragungsverbindung mit der Trimm-Energiequelle (B4), wobei der Hubstift (B7) mittels der Trimm-Energiequelle (B4) die Matrizenstützplatte (B5) durch die Hubführungssäule (B6) treibt, um sie nach oben und unten zu bewegen; die mit der Matrizenstützplatte (B5) verbundene konkave Schnittmatrize (B2) bewegt sich ebenfalls nach oben und unten; bei der Aufwärtsbewegung wird die konkave Schnittmatrize (B2) zum Schneiden mit der konvexen Schnittmatrize (B3) geklemmt; bei der Abwärtsbewegung wird die konkave Schnittmatrize (B2) von der konvexen Schnittmatrize (B3) getrennt; eine vertikale Gleitbahn (B8) ist an dem Montagegestell (B1) angebracht; eine Gleitplatte (B9) ist gleitend auf der vertikalen Gleitbahn (B8) angebracht; die Gleitplatte (B9) steht in Übertragungsverbindung mit einer Stanz-Energiequelle (B10), die die Gleitplatte (B9)

zur Auf- und Abwärtsbewegung auf der vertikalen Gleitbahn (B8) antreibt; die Gleitplatte (B9) ist mit einer Vakuumsaugmatrize (B11) verbunden; ein Vakuumsaugstab (B12) ist an der Vakuumsaugmatrize (B11) angebracht; die konvexe Schnittmatrize (B3) ist mit einem konvexen Matrizenloch (B30) versehen, damit der Vakuumsaugstab (B12) hindurchtreten kann; die konkave Schnittmatrize (B2) ist mit einem konkaven Matrizenloch (B20) versehen, damit die konvexe Schnittmatrize (B3) eintreten und der Vakuumsaugstab (B12) hindurchtreten kann; und die Matrizenstützplatte (B5) ist mit einem Stützplattenloch (B50) versehen, durch das der Vakuumsaugstab (B12) hindurchtreten kann, wobei der Vakuumsaugstab (B12) in Reaktion auf das Schneiden der konkaven Schnittmatrize (B2) und der konvexen Schnittmatrize (B3) den Blister ansaugt; nach Beendigung des Schneidens der konkaven Schnittmatrize (B2) und der konvexen Schnittmatrize (B3) bewegt die Stanz-Energiequelle (B10) die Gleitplatte (B9) nach unten, so dass der Vakuumsaugstab (B12) den Blister durch das konkave Matrizenloch (B20) der konkaven Schnittmatrize (B2) und das Stützplattenloch (B50) der Matrizenstützplatte (B5) führt, und den Blister auf die darunter befindliche Austragsgitter-Fördervorrichtung (11) legt.

8. Die integrierte Hochgeschwindigkeits-Blister-Kartonniermaschine nach Anspruch 7, wobei die konvexe Schnittmatrize (B3) mit einem Matrizenklemm-Führungsstift (B34) verbunden ist; die konkave Schnittmatrize (B2) ist mit einer Führungshülse (B25) verbunden; der Matrizenklemm-Führungsstift (B34) ist in der Führungshülse (B25) angeordnet; ein unteres Verriegelungselement (B21) ist an einer Seite der konkaven Schnittmatrize (B2) angebracht; das untere Verriegelungselement (B21) ist mit einer Verriegelungsnut versehen; und eine Seitenkante der konkaven Schnittmatrize (B2) und eine Seitenkante der Matrizenstützplatte (B5) befinden sich in der Verriegelungsnut des unteren Verriegelungselements (B21).
9. Die integrierte Hochgeschwindigkeits-Blister-Kartonniermaschine nach Anspruch 7, wobei eine horizontale Klemmnut (B31) in dem Montagegestell (B1) ausgebildet ist; eine Seitenkante der konvexen Schnittmatrize (B3) tritt in die horizontale Klemmnut (B31) des Montagegestells (B1) ein; die horizontale Klemmnut (B31) ist mit einem oberen Verriegelungselement (B33) versehen; ein oberer Bolzen (B32) ist an dem Montagegestell (B1) angebracht; der obere Bolzen (B32) ist mit dem oberen Verriegelungselement (B33) verschraubt; und das obere Verriegelungselement (B33) fixiert die konvexe Schnittmatrize (B3) in der horizontalen Klemmnut (B31).

10. Die integrierte Hochgeschwindigkeits-Blister-Karto-

niermaschine nach Anspruch 7, wobei die Trimm-Energiequelle (B4) in Übertragungsverbindung mit einer Exzenterwelle (B13) steht; ein exzentrischer Abschnitt der Exzenterwelle (B13) ist an einem Ende einer Verbindungsstange (B14) angebracht; das andere Ende der Verbindungsstange (B14) ist an einer Verbindungsstangenwelle (B15) angebracht; und die Verbindungsstangenwelle (B15) ist an einem Stützsitz (B70) auf dem Hubsitz (B7) angebracht.

## Revendications

1. Encartonneuse rapide intégrale sous blister, comprenant une emballeuse sous blister (1) et une encartonneuse (5), **caractérisée en ce que** l'emballeuse sous blister (1) comprenant un découpeur de blister (10) et un convoyeur à grille de décharge (11) où les blisters emballés (C) découpés par le découpeur de blister (10) étant introduits dans le convoyeur à grille de décharge (11), et ensuite évacués par le convoyeur à grille de décharge (11); l'encartonneuse (5) comprenant un convoyeur à grille d'alimentation (51) où les blisters emballés (C) étant introduits dans le convoyeur à grille de décharge (11), et acheminés par le convoyeur à grille d'alimentation (51) vers une station de l'encartonneuse (5) aux fins d'encartonnage; le convoyeur synchrone à écartement variable (3) étant juxtaposé au convoyeur à grille d'alimentation (51); un manipulateur de transfert de décharge sous blister (2) destiné à transférer les blisters emballés (C) sur le convoyeur à grille de décharge (11) vers le convoyeur synchrone à écartement variable (3) étant prévu au-dessus du convoyeur à grille de décharge (11); le manipulateur de transfert de décharge sous blister (2) comprenant une buse d'aspiration de décharge (20); un manipulateur de transfert d'alimentation sous blister (4) destiné à transférer les blisters emballés (C) sur le convoyeur synchrone à écartement variable (3) vers le convoyeur à grille d'alimentation (51) étant prévu au-dessus du convoyeur à grille d'alimentation (51); le manipulateur de transfert d'alimentation sous blister (4) comprenant une buse d'alimentation à vide (40); **caractérisé en ce que** le convoyeur synchrone à écartement variable (3) comprenant une base (30); une première glissière (301) et une deuxième glissière (302) étant juxtaposé au socle (30); plusieurs premiers logements coulissants (311) étant coulissants sur la première glissière (301); un premier plateau (321) étant disposé sur chacun des premiers logements coulissants (311); plusieurs deuxièmes logements coulissants (312) étant coulissants sur la deuxième glissière (302); un deuxième plateau (322) étant disposé sur chacun des deuxièmes logements coulissants (312); le premier logement coulissant (311) étant relié à un arbre d'articulation avec un axe rotatif prévu sur le premier logement

coulissant (311); deux bielles transversales (31) étant transversalement articulées sur l'arbre d'articulation; le deuxième logement coulissant (312) étant relié à un arbre d'articulation avec un axe rotatif prévu sur le deuxième logement coulissant (312); deux bielles transversales (31) étant transversalement articulées sur l'arbre d'articulation; les bielles transversales (31) sur deux premiers logements coulissants (311) et deux deuxièmes logements coulissants (312) adjacents étant transversalement articulées l'une par rapport à l'autre; l'un des premiers logements coulissants (311) étant relié à une première courroie de transmission (351); la première courroie de transmission (351) étant reliée par transmission à une première alimentation (361); l'un des deuxièmes logements coulissants (312) étant relié par transmission à une deuxième courroie de transmission (352); et la deuxième courroie de transmission (352) étant reliée par transmission à une deuxième alimentation (362).

2. Encartonneuse rapide intégrale sous blister selon la revendication 1, **caractérisée en ce qu'un** premier logement d'appui (331) étant prévu sur le premier logement coulissant (311); le premier plateau (321) étant prévu sur le premier logement d'appui (331); une première goupille de positionnement (371) étant prévue sur le premier logement d'appui (331); un premier trou de positionnement étant formé dans le premier plateau (321) pour permettre une insertion de la première goupille de positionnement (371); un deuxième logement d'appui étant prévu sur le deuxième siège coulissant (312); le deuxième plateau étant prévu sur le deuxième logement d'appui; une deuxième goupille de positionnement étant prévue sur le deuxième logement d'appui; et un deuxième trou de positionnement étant formé dans le deuxième plateau pour permettre une insertion de la deuxième goupille de positionnement.
3. Encartonneuse rapide intégrale sous blister selon la revendication 2, **caractérisée en ce qu'une** pince de positionnement (341) étant prévue sur le premier logement d'appui (331); une première rainure de positionnement permettant la pénétration de la première pince de positionnement (341) étant formée au fond du premier plateau (321); une deuxième pince de positionnement étant prévue sur le deuxième logement d'appui; et une deuxième rainure de positionnement permettant la pénétration de la deuxième pince de positionnement étant formée au fond du deuxième plateau.
4. Encartonneuse rapide intégrale sous blister selon la revendication 1, **caractérisée en ce que** le convoyeur à grille d'alimentation (11) comprenant un bâti de convoyeur (A10), une plaque à grille (A15), des premières plaques de poussée (A11), un mécanis-

me de transmission des premières plaques de poussée et une alimentation de poussée (A19) ; la plaque à grille (A15) étant pourvue d'un passage d'alimentation (A150) ; les premières plaques de poussée (A11) étant pourvues chacune d'une partie de poussée (A110) susceptible de se trouver dans le passage d'alimentation (A150) ; le premier mécanisme de transmission de plaque de poussée étant pourvu d'une première bande transporteuse (A13) ; les premières plaques de poussée (A11) étant reliées à la première courroie transporteuse (A13) ; la première courroie transporteuse (A13) étant reliée par transmission à l'alimentation de poussée (A19) ; le convoyeur à grille d'alimentation (11) comprenant des deuxièmes plaques de poussée (A12) et un deuxième mécanisme de transmission des plaques de poussée ; les deuxièmes plaques de poussée (A12) et les premières plaques de poussée (A11) étant disposées à intervalles ; les deuxièmes plaques de poussée (A12) étant chacune pourvues d'une partie de poussée pouvant être positionnée dans le passage d'amenée (A150) ; le mécanisme de transmission de la deuxième plaque de poussée comprenant une deuxième courroie transporteuse (A14) ; la deuxième courroie transporteuse (A14) étant juxtaposée à la première courroie transporteuse (A13) ; les deuxièmes plaques de poussée (A12) étant reliées par transmission à la deuxième courroie transporteuse (A14) ; et la deuxième courroie transporteuse (A14) étant reliée par transmission à l'alimentation de poussée (A19) ; ainsi, au cours de fonctionnement, les blisters (C) découpés par le découpeur de blister (10) tombant dans le passage d'alimentation (A150) de la plaque à grille (A15) ; l'alimentation de poussée (A19) entraînant le déplacement de la première courroie transporteuse (A13) et de la deuxième courroie transporteuse (A14) ; puisque les premières plaques de poussée (A11) étant reliées à la première courroie transporteuse (A13) ; la première courroie transporteuse (A13) faisant avancer les premières plaques de poussée (A11) ; et les parties de poussée (A110) des premières plaques de poussée (A11) poussant les blisters (C) vers l'avant ; parallèlement, étant donné que les deuxièmes plaques de poussée (A12) étant reliées à la deuxième courroie transporteuse (A14), la deuxième courroie transporteuse (A14) faisant avancer les deuxièmes plaques de poussée (A12), les parties de poussée des deuxièmes plaques de poussée (A12) poussant les blisters (C) vers l'avant.

5. Encartonneuse rapide intégrale sous blister selon la revendication 4, **caractérisée en ce qu'**une extrémité de chacune des deuxièmes plaques de poussée (A12) et des premières plaques de poussée (A11) étant reliée à un rouleau (A16), et un chemin de roulement (A17) permettant au rouleau (A16) de se déplacer étant prévu sur le bâti du transporteur

(A10), ainsi, lors du déplacement des plaques de poussée, les rouleaux (A16) se déplaçant sur le chemin de roulement (A17) du bâti du transporteur (A10) afin de supporter les plaques de poussée.

6. Encartonneuse rapide intégrale sous blister selon la revendication 5, **caractérisée en ce que** la buse de décharge à vide (20) du manipulateur de transfert de décharge sous blister (2) est pourvue d'une alimentation rotative.
7. Encartonneuse rapide intégrale sous blister selon la revendication 1, **caractérisée en ce que** le découpeur de blister (10) étant situé au-dessus du convoyeur à grille de décharge (11) ; le découpeur de blister (10) comprenant un bâti de montage (B1), un gabarit de découpage concave (B2), un gabarit de découpage convexe (B3) et une alimentation de découpage (B4) ; le gabarit de découpage convexe (B3) étant positionné sur le bâti de montage (B1) ; le gabarit de découpage concave (B2) étant situé sous le gabarit de découpage convexe (B3) ; le gabarit de découpage concave (B2) étant relié à une plaque de support de gabarit (B5) pour entraîner le gabarit de découpage concave (B2) vers le haut et vers le bas ; la plaque de support de gabarit (B5) étant reliée à l'extrémité inférieure de la colonne de guidage de levage (B6) ; la colonne de guidage de levage (B6) étant fixée de manière coulissante sur le bâti de montage (B1) ; une extrémité supérieure de la colonne de guidage de levage (B6) étant reliée à un logement de levage (B7) ; le logement de levage (B7) étant relié par transmission à l'alimentation de découpage (B4) ; le logement de levage (B7) entraînant le déplacement vers le haut et vers le bas de la plaque de support de matrice (B5) à travers la colonne de guidage de levage (B6) ; le gabarit de découpage concave (B2) étant relié à la plaque de support de gabarit (B5) pouvant également être déplacé vers le haut et vers le bas ; le gabarit de découpage concave (B2) étant serré avec le gabarit de découpage convexe (B3) pour le découpage lors du déplacement vers le haut ; le gabarit de découpage concave (B2) étant fractionné avec le gabarit de découpage convexe (B3) lors du déplacement vers le bas ; une glissière verticale (B8) étant prévue sur le bâti de montage (B1) ; une plaque coulissante (B9) étant positionnée de manière coulissante sur la glissière verticale (B8) ; la plaque coulissante (B9) étant reliée par transmission à une alimentation de découpage (B10) pour entraîner le déplacement vers le haut et vers le bas pour la plaque coulissante (B9) sur la glissière verticale (B8) ; la plaque coulissante (B9) étant reliée à un gabarit d'absorption à vide (B11) ; une tige d'aspiration à vide (B12) étant prévue sur le gabarit d'absorption à vide (B11) ; le gabarit de découpage convexe (B3) étant pourvu d'un trou de découpage convexe (B30) pour permettre

un passage de la tige d'aspiration à vide (B12) ; le gabarit de découpage concave (B2) étant pourvu d'un trou de découpage concave (B20) pour permettre l'entrée du gabarit de découpage convexe (B3) et le passage de la tige d'aspiration à vide (B12) ; et la plaque de support de gabarit (B5) étant pourvue d'un trou de plaque de support (B50) pour permettre le passage de la tige d'aspiration (B12); la tige d'aspiration (B12) aspirant le blister en réponse au découpage du gabarit de découpage concave (B2) et du gabarit de découpage convexe (B3) ; dès la fin du découpage du gabarit de découpage concave (B2) et du gabarit de découpage convexe (B3), l'alimentation de découpage (B10) entraînant la plaque coulissante (B9) vers le bas, ce qui permet à la tige d'aspiration à vide (B12) de faire passer le blister par le trou du gabarit de découpage concave (B20) du gabarit de découpage concave (B2) et le trou de la plaque de support (B50) de la plaque de support du gabarit (B5), et d'introduire le blister dans le convoyeur à grille de décharge (11) situé en-dessous.

8. Encartonneuse rapide intégrale sous blister selon la revendication 7, **caractérisée en ce que** le gabarit de découpage convexe (B3) étant relié à une colonne de guidage (B34) ; le gabarit de découpage concave (B2) étant relié à une douille de guidage (B25) ; la colonne de guidage (B34) étant positionnée dans la douille de guidage (B25) ; un élément de verrouillage inférieur (B21) étant positionné sur un côté du gabarit de découpage concave (B2) ; l'élément de verrouillage inférieur (B21) étant pourvu d'une rainure de verrouillage ; et un bord latéral du gabarit de découpage concave (B2) et un bord latéral de la plaque de support de gabarit (B5) étant situés dans la rainure de verrouillage de l'élément de verrouillage inférieur (B21).
9. Encartonneuse rapide intégrale sous blister selon la revendication 7, **caractérisée en ce qu'**une rainure de serrage horizontale (B31) étant formée dans le bâti de montage (B1) ; un bord latéral du gabarit de découpage convexe (B3) pénétrant dans la rainure de serrage horizontale (B31) du bâti de montage (B1) ; la rainure de serrage horizontale (B31) étant pourvue d'un élément de verrouillage supérieur (B33) ; un boulon supérieur (B32) étant prévu sur le bâti de montage (B1) ; le boulon supérieur (B32) étant relié par filetage à l'élément de verrouillage supérieur (B33); et l'élément de verrouillage supérieur (B33) fixant le gabarit de découpage convexe (B3) dans la rainure de serrage horizontale (B31).
10. Encartonneuse rapide intégrale sous blister selon la revendication 7, **caractérisée en ce que** l'alimentation de découpage (B4) étant reliée par transmission à un arbre excentrique (B13) ; une partie excentrique de l'arbre excentrique (B13) étant articulée à une

extrémité d'une bielle (B14) ; l'autre extrémité de la bielle (B14) étant articulée à un arbre de bielle (B15) ; et l'arbre de bielle (B15) étant articulé à un logement d'appui (B70) sur le siège de levage (B7).

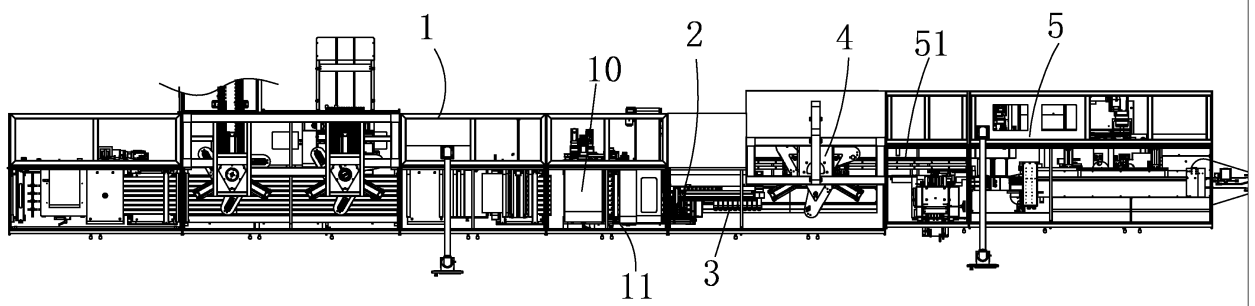


FIG. 1

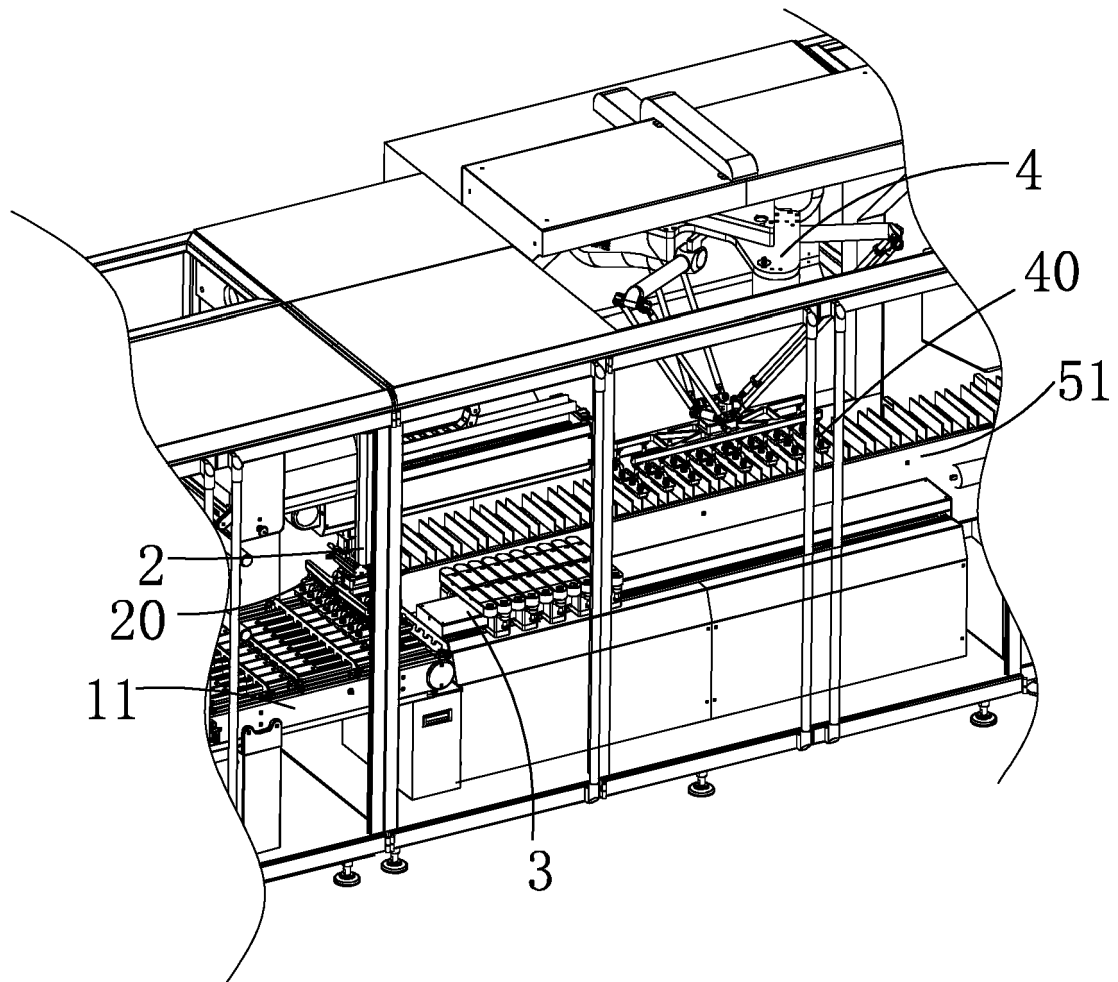


FIG. 2

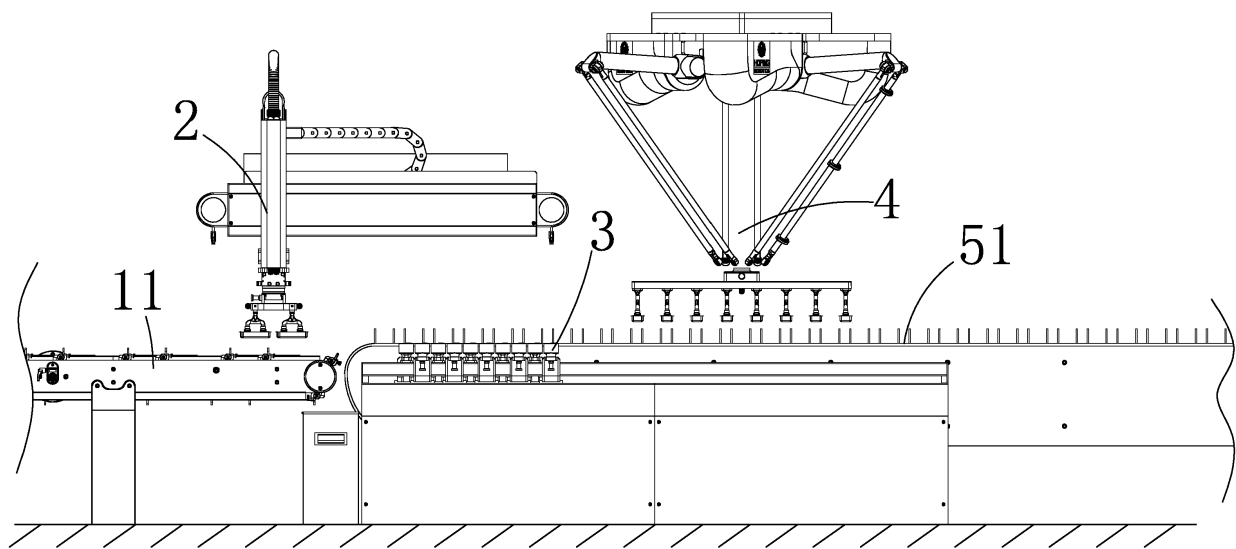


FIG. 3

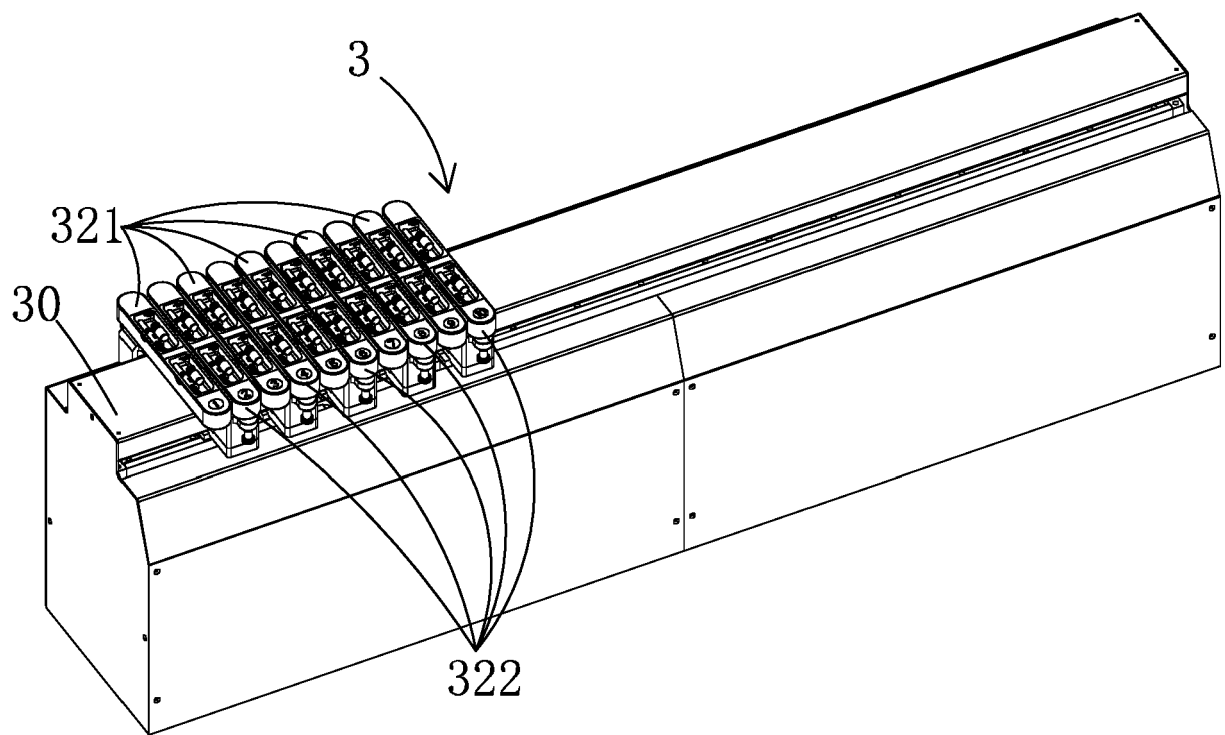


FIG. 4

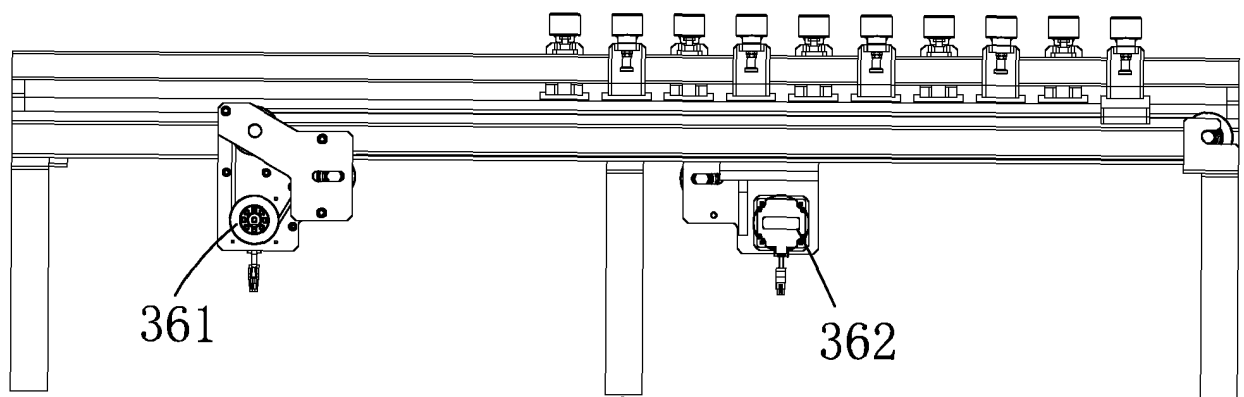


FIG. 5

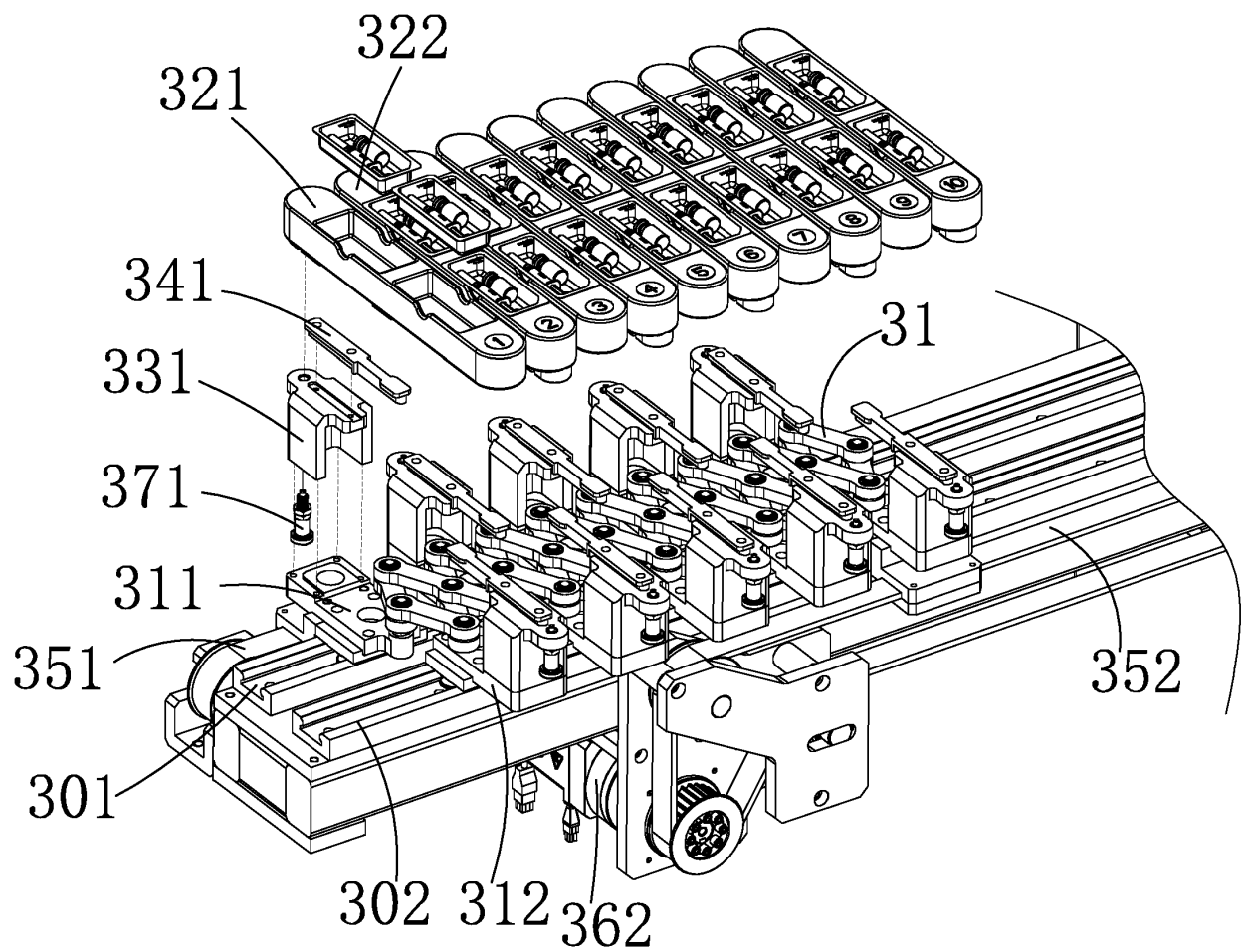


FIG. 6

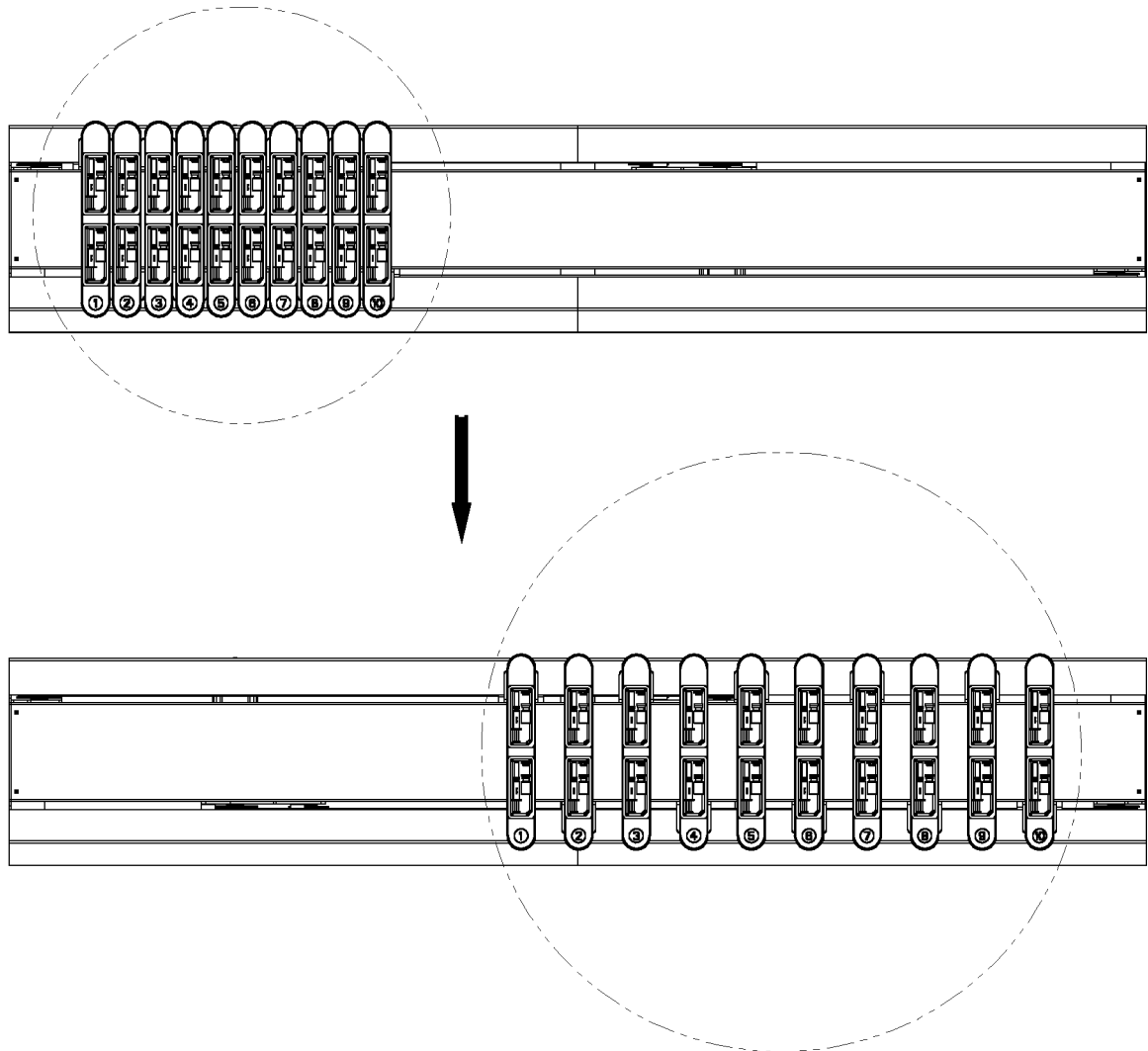


FIG. 7

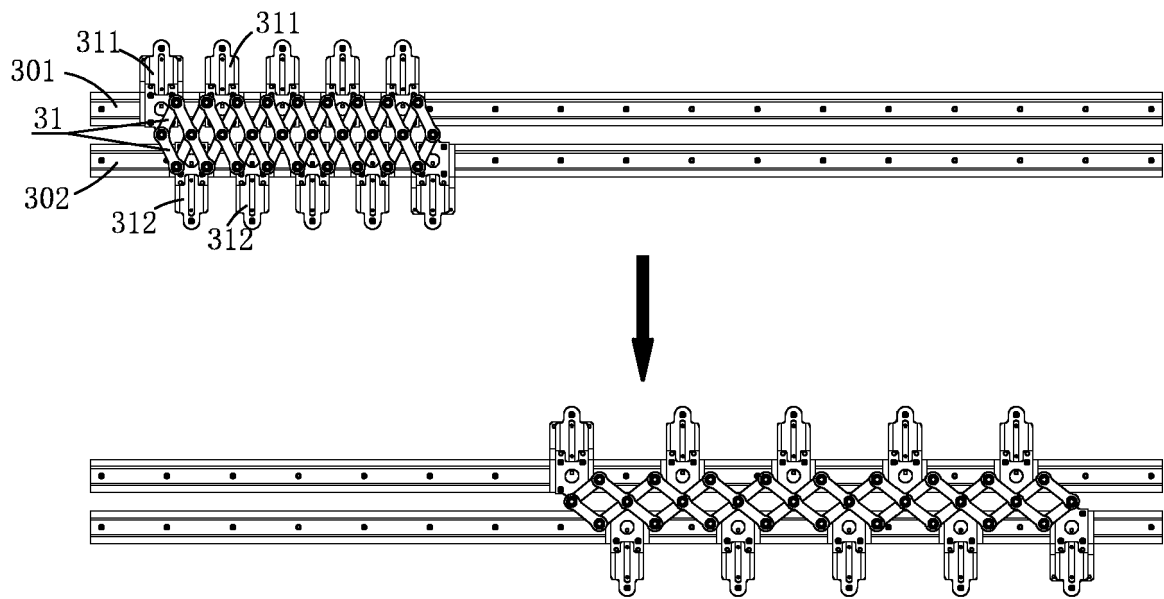


FIG. 8

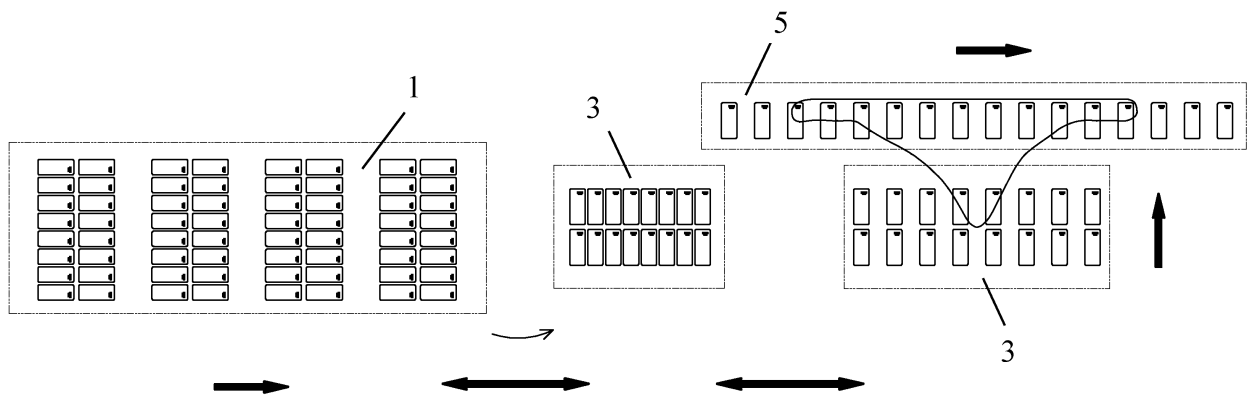


FIG. 9

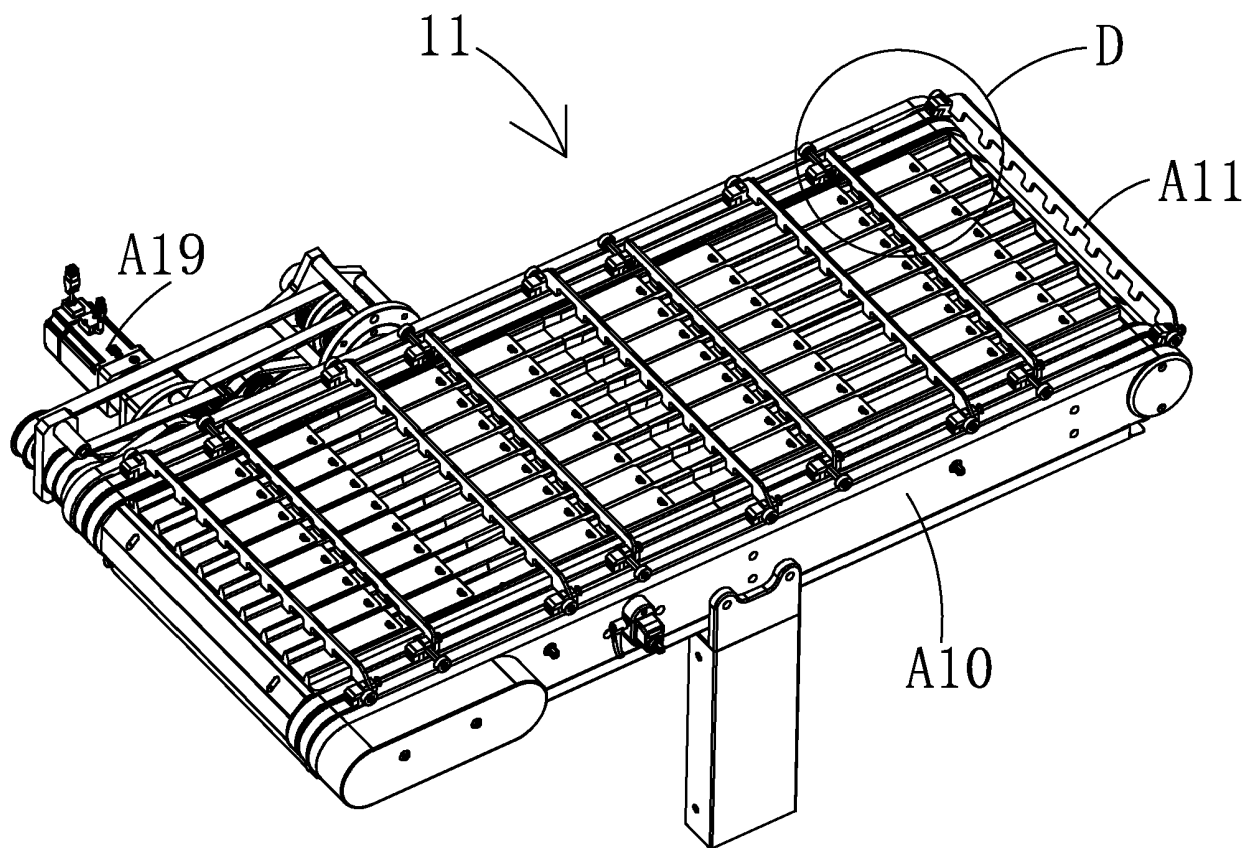


FIG. 10

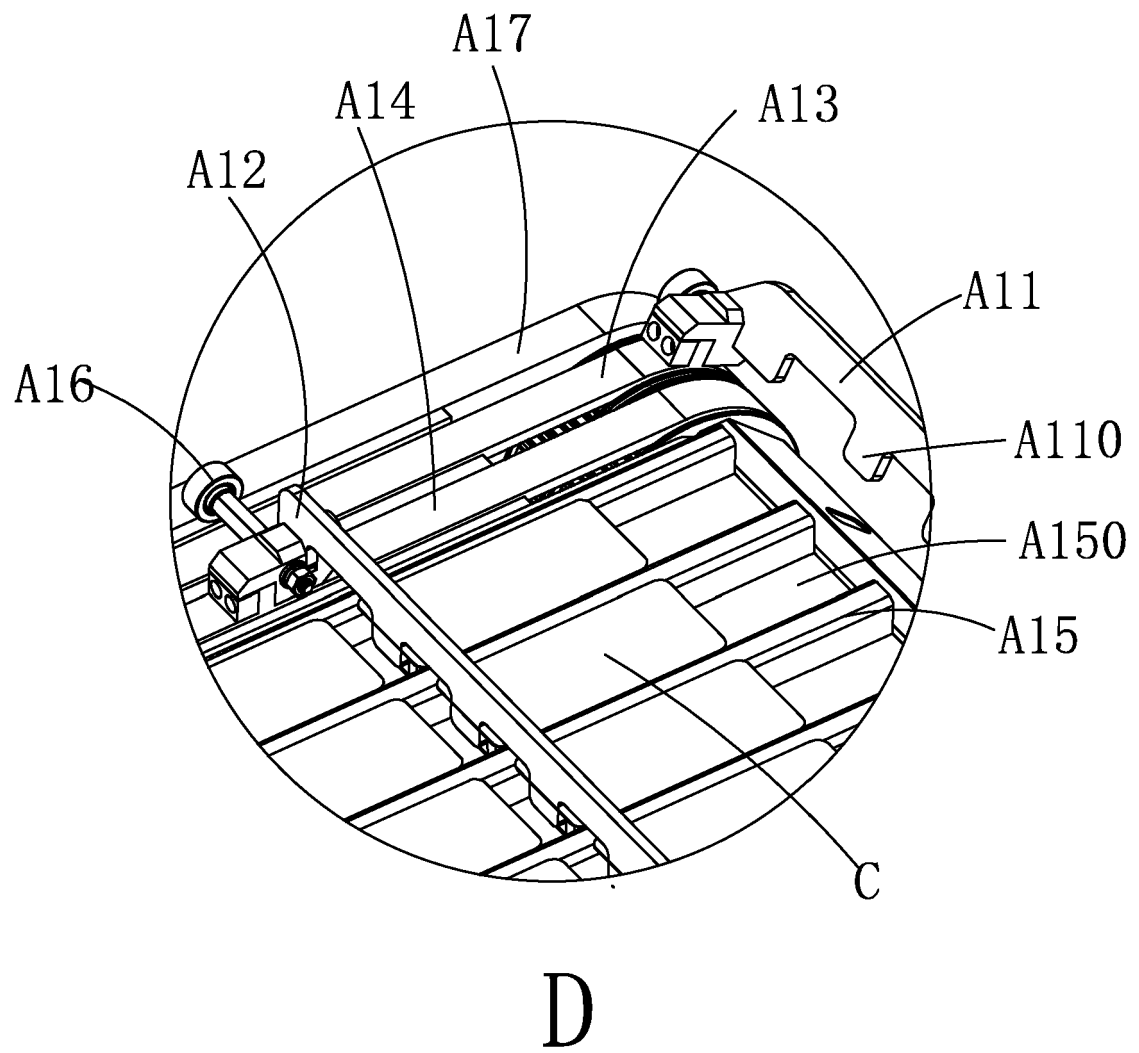


FIG. 11

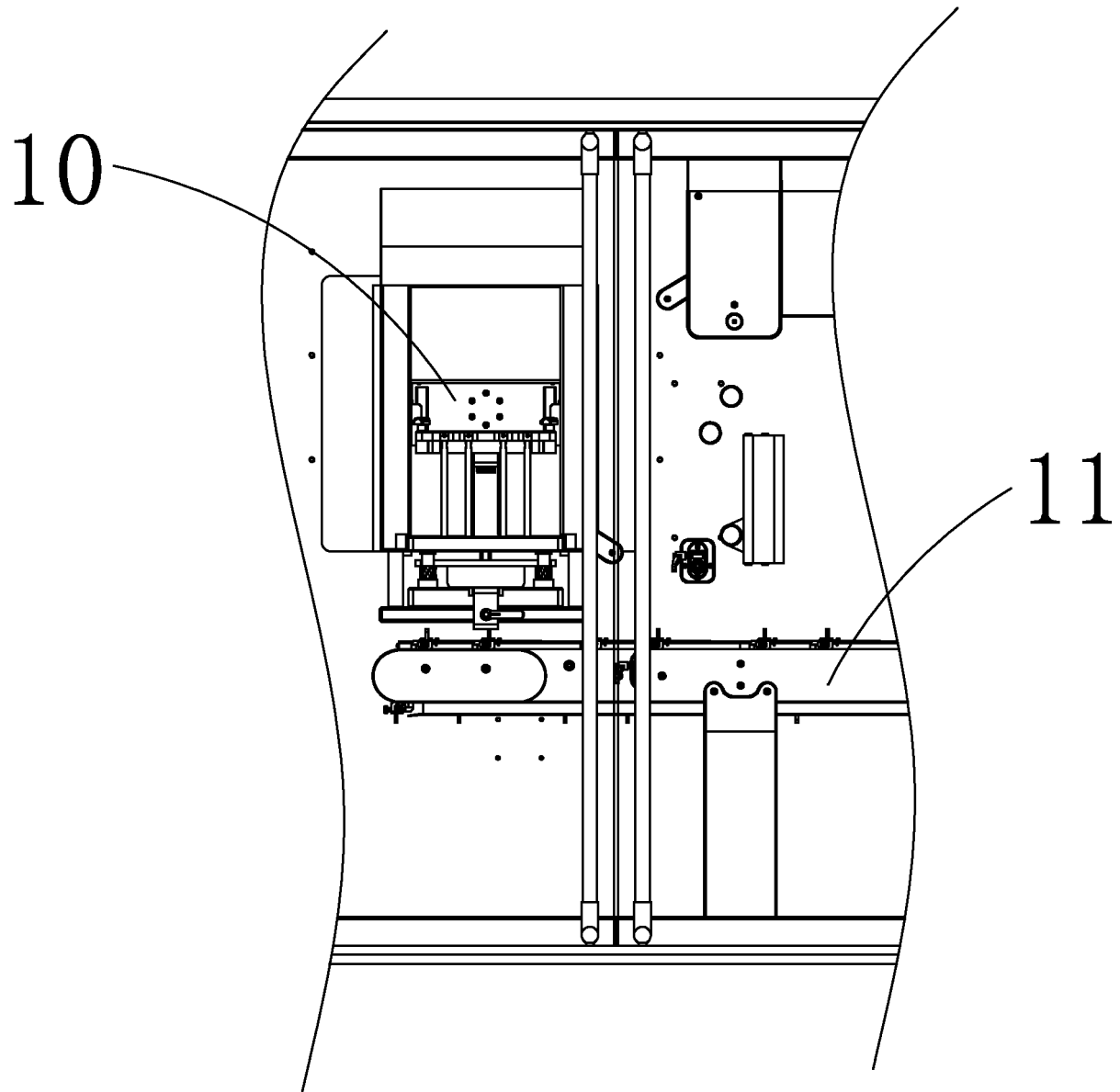


FIG. 12

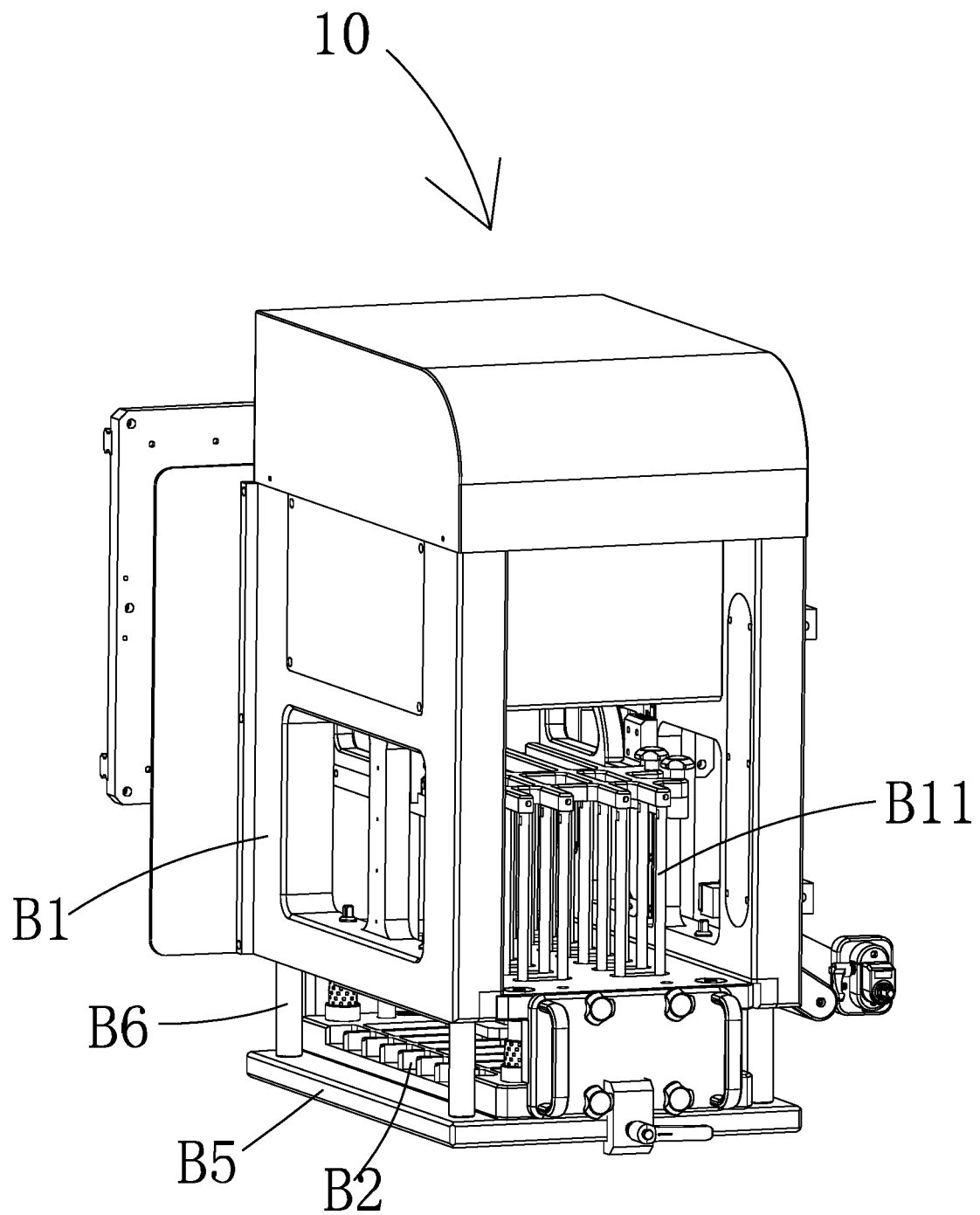


FIG. 13

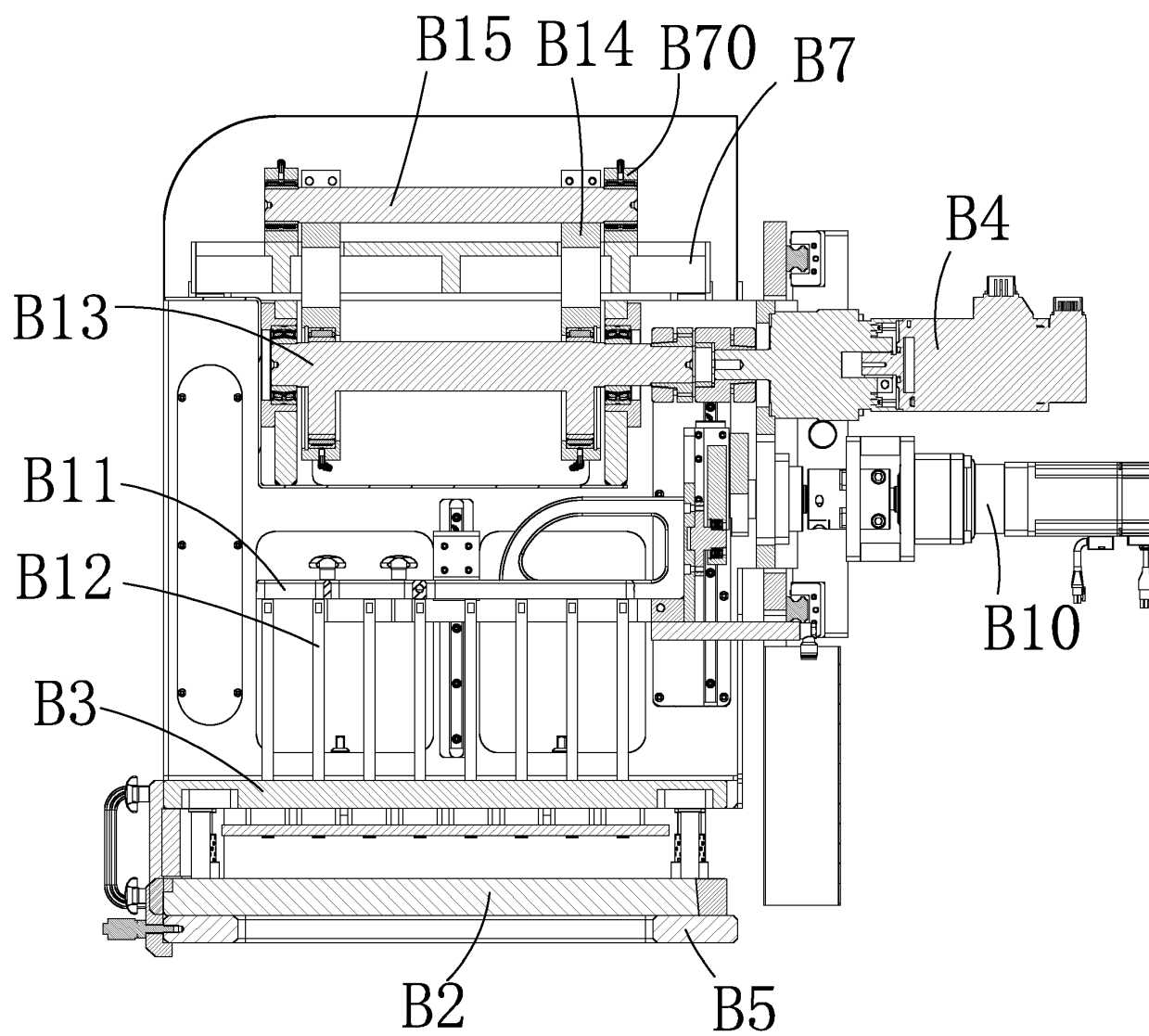


FIG. 14

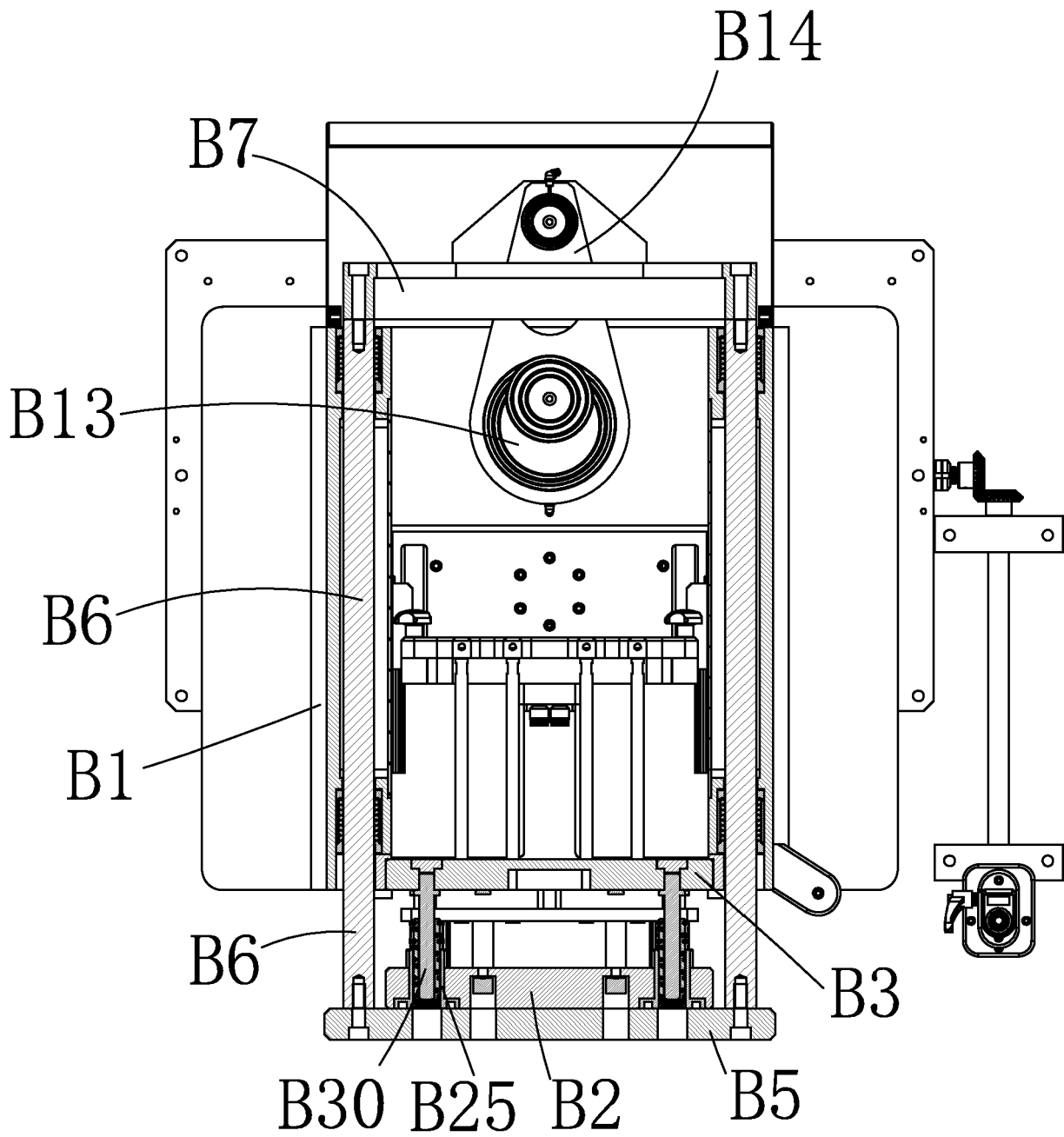


FIG. 15

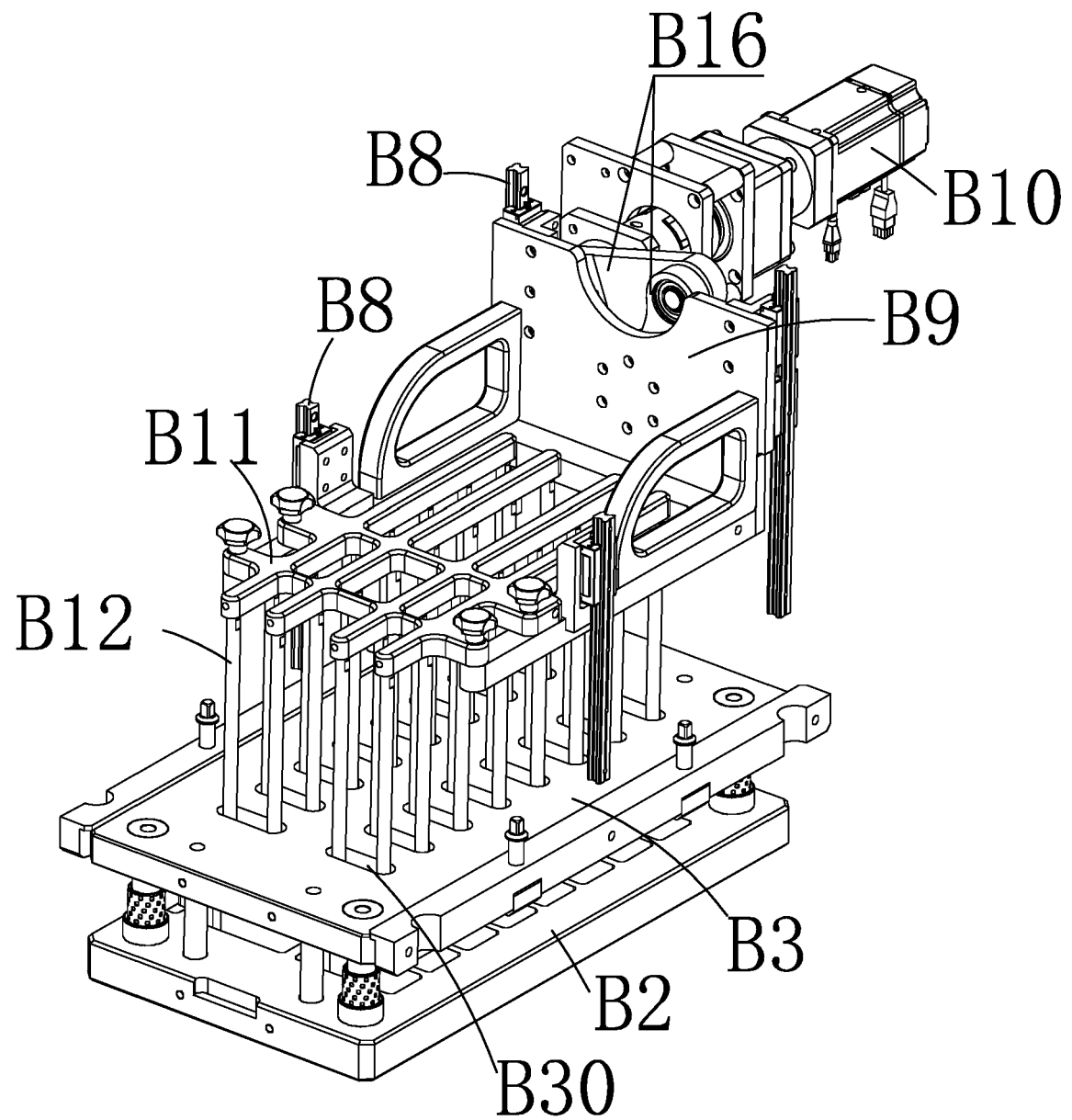


FIG. 16

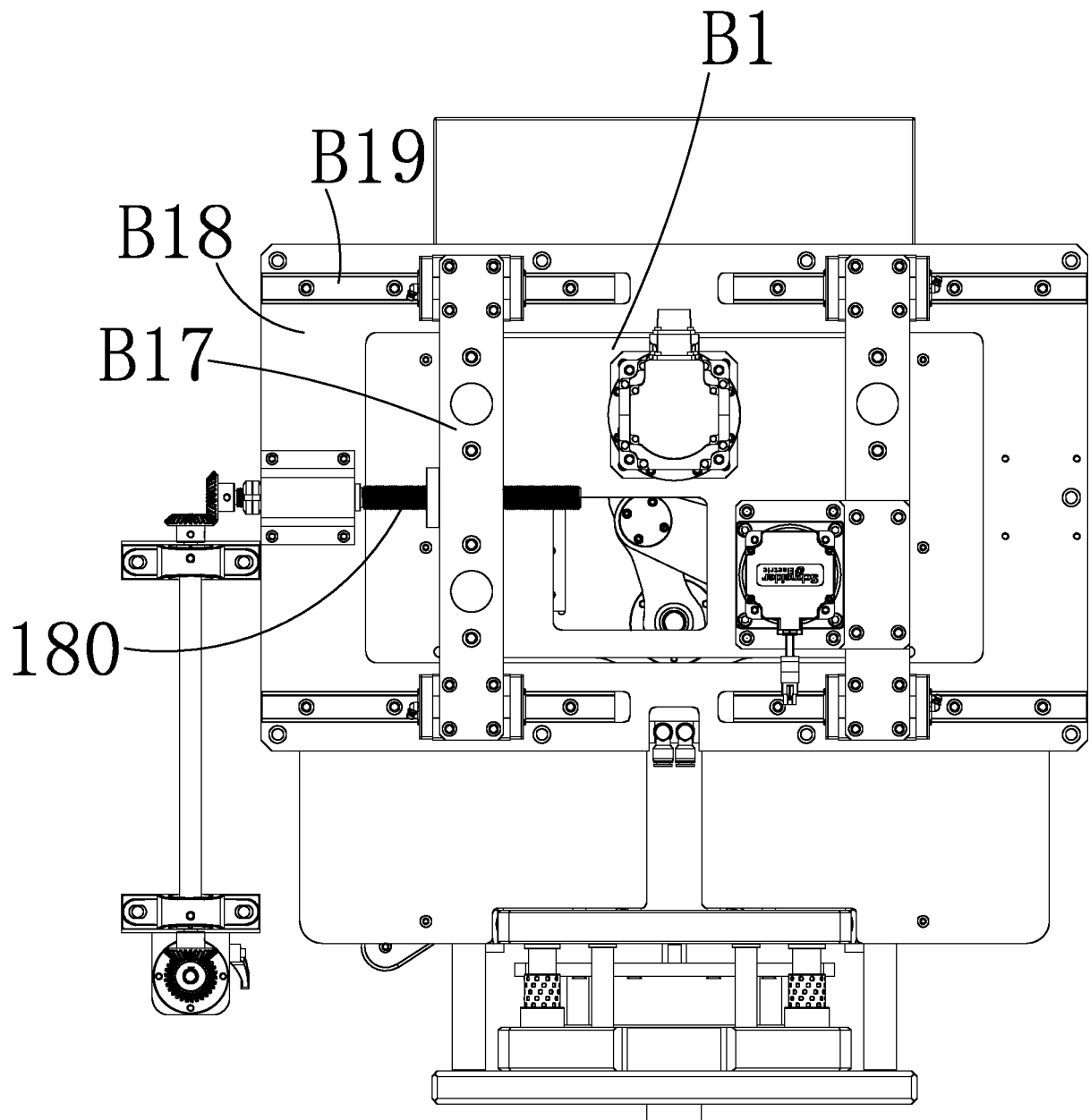


FIG. 17

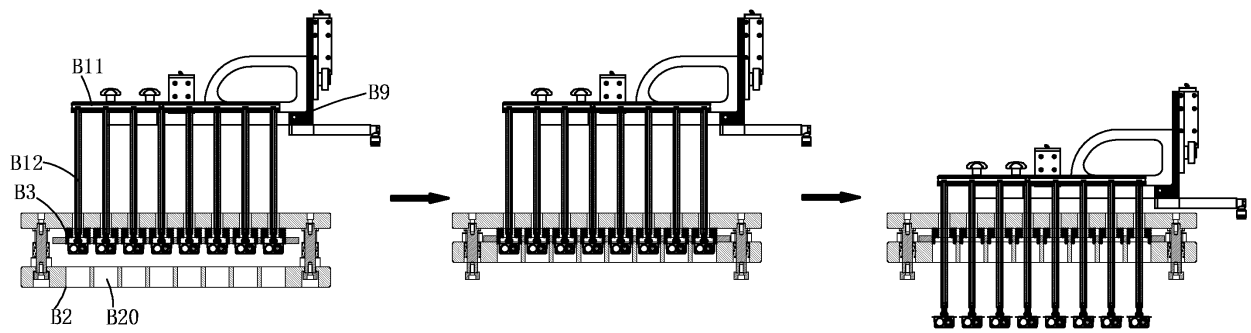


FIG. 18

Substitute Sheet of Amended Figure 19

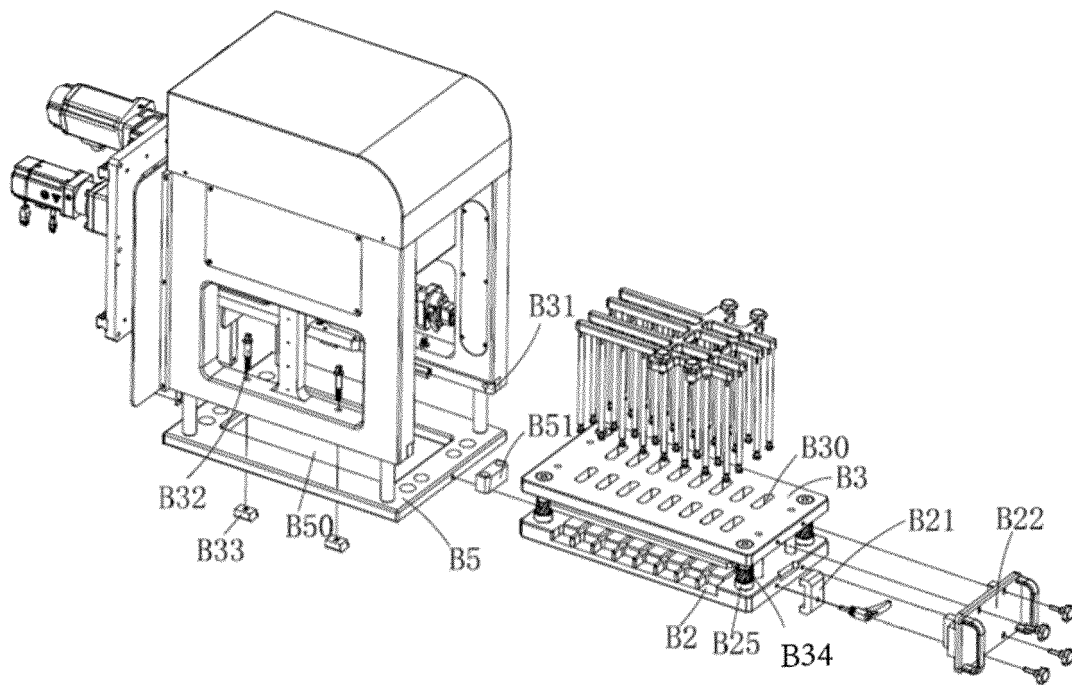


FIG. 19

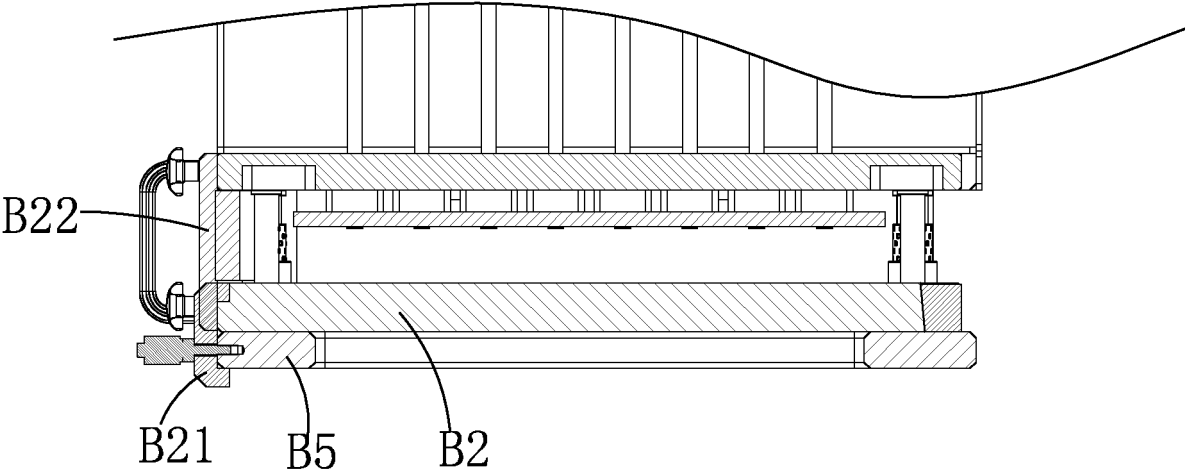


FIG. 20

**REFERENCES CITED IN THE DESCRIPTION**

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