CLAIMS

1. An article transfer device, comprising:

a machine frame, comprising a machine chamber;

a lift assembly;

a conveying platform, at a bottom of the machine chamber of the machine frame; and

multiple loading plates, connected with the machine frame by the lift assembly;

wherein each loading plate of the multiple loading plates is provided with a first comb structure comprising multiple first loading rods, and the conveying platform is provided with a second comb structure comprising multiple second loading rods and matching the first comb structure; wherein the multiple loading plates comprise a first loading plate and a second loading plate; the first loading plate comprises a loading plate body, the first comb structure is transversely on the loading plate body, a direction guiding structure is provided vertically on the loading plate body, and a position limiter is provided at an end of the direction guiding structure away from the loading plate body; a hitching portion is provided on the second loading plate, the first loading plate is under the second loading plate, and the first loading plate is hitched to the hitching portion of the second loading plate by the position limiter of the first loading plate; wherein the hitching portion of the second loading plate is inside the direction guiding structure of the first loading plate, such that the second loading plate moves up and down along the direction guiding structure of the first loading plate; and

in response to that the article transfer device transfer articles, the lift assembly is configured to control the multiple loading plates to move along a direction perpendicular to the conveying platform, and the first comb structures of the multiple loading plates run through a plane where the second comb structure of the conveying platform is located, such that the multiple loading plates perform article exchange with the conveying platform.

2. The article transfer device of claim 1, wherein for each of the multiple first loading rods, the first loading rod is a telescopic rod;

in response to that each loading plate of the multiple loading plates runs through the plane where the conveying platform is located to transfer an article to the conveying platform, the lift assembly is configured to control multiple telescopic rods of the loading plate to retract and control the loading plate to move down; and

in response to that each loading plate of the multiple loading plates runs through the plane where the conveying platform is located to receive an article from the conveying platform, the lift assembly is configured to control the multiple telescopic rods of the loading plate to extend and control the loading plate to move up.

3. The article transfer device of claim 1, wherein the multiple first loading rods and the multiple second loading rods are alternately disposed.

4. The article transfer device of claim 3, wherein for each first loading rod of the multiple first loading rods, the first loading rod is a non-telescopic rod;

in response to that each loading plate of the multiple loading plates runs through the plane where the conveying platform is located to transfer an article to the conveying platform, the lift assembly is configured to control multiple non-telescopic rods of the loading plate to move down through the multiple second loading rods; and

in response to that each loading plate of the multiple loading plates runs through the plane where the conveying platform is located to receive an article from the conveying platform, the lift assembly is configured to control the multiple non-telescopic rods of the loading plate to move up.

5. The article transfer device of claim 1, further comprising a control mechanism; wherein,

the control mechanism is inside the machine frame or at an outer side of the machine frame; and

the control mechanism is configured to control the multiple second loading rods, the multiple loading plates and a conveying device for conveying articles to perform article exchange.

6. The article transfer device of claim 5, wherein for each second loading rod of the multiple second loading rods of the conveying platform, the second loading rod is a rotatable rod; and

the control mechanism is configured to control rotation of the rotatable rods of the conveying platform, such that the conveying platform performs article exchange with the conveying device during the rotation of the rotatable rods of the conveying platform.

7. The article transfer device of claim 5, wherein for each second loading rod of the multiple second loading rods of the conveying platform, the second loading rod is a telescopic rod;

in response to that each loading plate runs through the plane where the conveying platform is located to perform article exchange with the conveying platform, the control mechanism is configured to control the telescopic rods of the conveying platform to extend or retract; and

the control mechanism is further configured to control the telescopic rods to rotate, such that the conveying platform performs article exchange with the conveying device during rotation of the telescopic rods of the conveying platform.

8. The article transfer device of claim 1, wherein the first loading plate is under the second loading plate;

the first loading plate drops to a first predetermined position below the conveying platform and stops dropping, and the second loading plate drops to stack on the first loading plate; and

the second loading plate moves to a second predetermined position from bottom up, and a hitching portion of the second loading plate is hitched to a position limiter of the first loading plate, and the second loading plate continues moving up to bring the first loading plate to move up by the hitching portion of the second loading plate.

9. The article transfer device of claim 1, wherein the direction guiding structure provided vertically on the loading plate body comprises an elongated guiding member, and a guiding groove is provided along a length direction of the elongated guiding member in the elongated guiding member; the position limiter is on a top end of the guiding groove; and

the hitching portion of the second loading plate is inside the guiding groove of the first loading plate, such that the second loading plate moves up and down along the guiding groove of the first loading plate.

10. The article transfer device of claim 9, wherein for each loading plate of the multiple loading plates, the elongated guiding member of the loading plate comprises a first guiding member and a second guiding member, and the first guiding member and the second guiding member are provided parallelly at both sides of the loading plate body of the loading plate; a first guiding groove is provided along a length direction of the first guiding member, and

a second guiding groove is provided along a length direction of the second guiding member; the hitching portion of the second loading plate comprises a first hitching portion and a second hitching portion; and

the first hitching portion of the second loading plate is in the first guiding groove of the first loading plate, and the second hitching portion of the second loading plate is in the second guiding groove of the first loading plate.

11. The article transfer device of claim 10, wherein the machine frame comprises a first column and a second column, the first column and the second column are in parallel, and the machine chamber is formed between the first column and the second column;

a third guiding groove is provided along a length direction of the first column in the first column; a fourth guiding groove is provided along a length direction of the second column in the second column; the third guiding groove is opposite to the fourth guiding groove;

an end of the first hitching portion of the second loading plate is outside the first guiding groove of the first loading plate and inside the third guiding groove, such that the first loading plate and the second loading plate move up and down along the third guiding groove; and

an end of the second hitching portion of the second loading plate is outside the second guiding groove of the first loading plate and inside the fourth guiding groove, such that the first loading plate and the second loading plate move up and down along the fourth guiding groove.

12. The article transfer device of claim 1, wherein the direction guiding structure provided vertically on the loading plate body comprises an elongated guiding member, and a guiding surface is provided along a length direction of the elongated guiding member in the elongated guiding member; the position limiter is at a top end of the guiding surface; and

the hitching portion of the second loading plate is mated with the guiding surface of the first loading plate, such that the second loading plate moves up and down along the guiding surface of the first loading plate.

13. The article transfer device of claim 12, wherein for each loading plate of the multiple loading plates, the elongated guiding member of the loading plate comprises a third guiding

member and a fourth guiding member, the third guiding member and the fourth guiding member are provided parallelly at both sides of the loading plate body of the loading plate, and the position limiter is at top ends of the third guiding member and the fourth guiding member;

a first guiding surface is provided along a length direction of the third guiding member, and a second guiding surface is provided along a length direction of the fourth guiding member; and

the hitching portion of the second loading plate comprises a third hitching portion and a fourth hitching portion; the third hitching portion of the second loading plate is mated with the first guiding surface of the first loading plate, such that the third hitching portion of the second loading plate moves up and down along the first guiding surface of the first loading plate; and the fourth hitching portion of the second loading plate is mated with the second guiding surface of the first loading plate, such that the fourth hitching portion of the second loading plate moves up and down along the second guiding surface of the first loading plate.

14. The article transfer device of claim 1, wherein the machine frame comprises a first column and a second column, the first column and the second column are in parallel, and the machine frame is formed between the first column and the second column;

a third guiding groove is provided along a length direction of the first column in the first column; a fourth guiding groove is provided along a length direction of the second column in the second column; the third guiding groove is opposite to the fourth guiding groove;

in the multiple loading plates, a first side of at least one loading plate is provided with a first protrusion portion, and a second side of the at least one loading plate is provided with a second protrusion portion; and

the first protrusion portion is inside the third guiding groove such that the at least one loading plate moves up and down along the third guiding groove; the second protrusion portion is inside the fourth guiding groove such that the at least one loading plate moves up and down along the fourth guiding groove.

15. The article transfer device of claim 1, wherein the lift assembly comprises a drive mechanism and a traction member connected with the drive mechanism, and the traction member is connected with a topmost loading plate in the multiple loading plates.

16. The article transfer device of claim 1, wherein in the multiple loading plates, a distance between two adjacent loading plates above the conveying platform is greater than a distance between two adjacent loading plates below the conveying platform.

17. A warehousing system, comprising a conveying device, an article storage mechanism and the article transfer device in any one of claims 1 to 16; wherein,

the article transfer device is connected with the conveying device;

the article transfer device is configured to perform article exchange with the article storage mechanism and the conveying device respectively.

18. The warehousing system of claim 17, wherein the article storage mechanism is a material box robot.

19. The warehousing system of claim 17, wherein the conveying device is a roller conveying line.