[CLAIMS]

[Claim 1]

An automatic chemical container transfer device comprising:

at least one transfer line configured to transfer a chemical container (2) loaded on an inlet portion (110) to a chemical supply device (5); and

a control portion configured to receive chemical information of the chemical container (2) transferred through the transfer line and to control the chemical container (2) to be supplied to the chemical supply device (5) when the received chemical information coincides with information required in the chemical supply device (5);

wherein an outlet portion (210) configured to discharge the chemical container, of which all chemicals are used, in the chemical supply device (5) is provided on a side of the inlet portion (110), and

wherein the at least one transfer line comprises a first transfer line (100) connected to the inlet portion (110) and comprises a second transfer line (200) disposed to be parallel and adjacent to the first transfer line (100) and connected to the outlet portion (210).

[Claim 2]

The automatic chemical container transfer device of claim 1, wherein a first inspection portion (130) configured to inspect chemical information of the chemical container (2) transferred through the first transfer line (100) is provided, and the control portion receives the chemical information from the first inspection portion (130).

[Claim 3]

The automatic chemical container transfer device of claim 1, wherein a pallet (3) on which the chemical container (2) is loaded is mounted on a transfer member (111) provided in the inlet portion (110), and

wherein at least one holding bracket (115) is provided on an entrance side of the inlet portion (110) so that the pallet (3) mounted on the transfer member (111) is held when the pallet (3) is transferred toward the entrance of the inlet portion (110).

[Claim 4]

The automatic chemical container transfer device of claim 1, wherein a pallet (3) on which the chemical container (2) is loaded is mounted on a transfer member (111) provided in the inlet portion (110), and

wherein since tilted surfaces are formed on inner surfaces formed on both sides of the inlet portion (110) to have a certain length along a transfer direction of the chemical container (2) and to face each other, a pair of tilt guides (116-1, 116-2) configured to guide the pallet (3) to be mounted in the inlet portion (110) are provided.

[Claim 5]

The automatic chemical container transfer device of claim 2, wherein a first alignment portion (120) configured to align a pallet (3), on which the chemical container (2) is loaded, on a central part of the first transfer line (100) is provided between the inlet portion (110) and the first inspection portion (130).

[Claim 6]

The automatic chemical container transfer device of claim 5, wherein the first alignment portion (120) comprises:

a plurality of transfer members (121) configured to transfer the chemical container (2) and the pallet (3), which are transferred from the inlet portion (110), along the first transfer line (100);

a pair of alignment members (124-1), (124-2) configured to push and align both sides of the pallet (3) to be parallel to the first transfer line (100); and

a pair of alignment driving portions (123-1), (123-2) configured to allow the alignment members (124-1), (124-2) to reciprocate in directions opposite each other.

[Claim 7]

The automatic chemical container transfer device of claim 6, wherein the alignment members (124-1), (124-2) extend lengthwise toward the transfer line and at least partially come into surface contact with sides of the pallet (3).

[Claim 8]

The automatic chemical container transfer device of claim 6, wherein a lifting member (128) configured to lift the pallet (3) upward while the pallet (3) is mounted on the transfer members (121) and a lift driving portion (127) configured to lift the lifting member (128) in a vertical direction are provided, and

wherein the control portion drives the lift driving portion (127) to allow the lifting member (128) to lift the pallet (3) from the transfer members (121) and drives the alignment driving portions (123-1), (123-2) to allow the alignment members (124-1), (124-2) to push both sides of the pallet (3) to align the pallet (3).

[Claim 9]

The automatic chemical container transfer device of claim 8, wherein surfaces of the transfer members (121) include a synthetic resin material, and

wherein the lifting member (128) configured to come into contact with a bottom surface of the pallet (3) due to lift driving of the lift driving portion (127) includes a metal material.

[Claim 10]

The automatic chemical container transfer device of claim 2, wherein a first inspection portion (130) comprises a chemical container scanner configured to scan chemical information on a surface of the chemical container (2), and

wherein the control portion determines whether the chemical container (2) corresponds to a chemical container needed by the chemical supply device (5) from the chemical information received from the chemical container scanner.

[Claim 11]

The automatic chemical container transfer device of claim 10, wherein the first inspection portion (130) further comprises scanner driving portions (131), (132) configured to shift a position of the chemical container scanner, and

wherein the scanner driving portions (131), (132) comprise a first scanner driving portion (131) and a second scanner driving portion (132) which are movable in a plane defined by two axes perpendicularly intersecting each other to scan the surface of the chemical container (2).

[Claim 12]

The automatic chemical container transfer device of claim 1, wherein a first inspection portion (130) comprises at least one pallet scanner (133), (134) configured to scan chemical information on a surface of a pallet (3) on which the chemical container (2) is loaded, and

wherein the control portion determines whether the chemical information of the pallet (3) corresponds to chemicals needed by the chemical supply device (5) from the chemical information received from the pallet scanners (133), (134).

[Claim 13]

The automatic chemical container transfer device of claim 2, wherein a first inspection portion (130) further comprises a plurality of frames (135c) disposed on a lateral perimeter of the chemical container (2) with a length in a vertical direction and further comprise at least one protrusion sensor (136), (137) configured to detect whether the chemical container (2) or a packing material of the chemical container (2) protrudes further than the frames (135c) on each of the plurality of frames (135c).

[Claim 14]

The automatic chemical container transfer device of claim 13, wherein the protrusion sensors (136), (137) comprise a first light emitting portion (136a) and a first light receiving portion (136b) which are disposed to face each other to detect whether the chemical container (2) or the packing material of the chemical container (2) protrudes above a vertical plane on one side of the chemical container (2) and comprise a second light emitting portion (137a) and a second light receiving portion (137b) which are disposed to generate a light beam intersecting a light beam from the first light emitting portion (136a) toward the first light receiving portion (136b).

[Claim 15]

The automatic chemical container transfer device of claim 1, wherein when the chemical container (2) cannot be loaded in through the inlet portion (110) or the first transfer line (100), the chemical container (2) is loaded in through the outlet portion (210) and transferred through the second transfer line (200).

[Claim 16]

The automatic chemical container transfer device of claim 2, wherein first connection portions (140), (240) which are configured to connect the first transfer line (100) and the second transfer line (200) to each other are provided so as for the first inspection portion (130) to switch a transfer direction of the chemical container (2) to transfer the chemical container (2) to the second transfer line (200) when a first inspection portion (130) determines that the chemical container (2) transferred from the inlet portion (110) is incorrectly loaded, and

wherein the chemical container (2) transferred from the first inspection portion (130) to the second transfer line (200) through the first connection portions (140), (240) is discharged through the outlet portion (210).

[Claim 17]

The automatic chemical container transfer device of claim 16, wherein the first connection portions (140), (240) comprise:

a first transfer line connection portion (140) provided on the first transfer line (100) and comprising a first direction switching member (143) configured to transfer the chemical container (2) toward the second transfer line (200); and

a second transfer line connection portion (240) provided on the second transfer line (200) and comprising a second direction switching member having a structure symmetrical to that of the first direction switching member (143) to transfer and mount the chemical container (2) transferred by the first direction switching member (143) to and on the second transfer line (200).

[Claim 18]

The automatic chemical container transfer device of claim 17, wherein the first transfer line connection portion (140) further comprises a plurality of transfer members (141) configured to transfer the chemical container (2) along the first

transfer line (100) and further comprises a first lifting portion (146) configured to lift the first direction switching member (143),

wherein the first direction switching member (143) is configured to be lifted between a pair of neighboring transfer members (141) among the plurality of transfer members (141), and

wherein when the first direction switching member (143) is lifted by the first lifting portion (146) and lifts the chemical container (2), the first direction switching member (143) is driven by a first direction switching driving portion (144) to transfer the chemical container (2) to the second direction switching member.

[Claim 19]

The automatic chemical container transfer device of claim 17, wherein the second transfer line connection portion (240) further comprises a plurality of transfer members configured to transfer the chemical container (2) along the second transfer line (200) and further comprises a second lifting portion configured to lift the second direction switching member,

wherein the second direction switching member is configured to be lifted between a pair of neighboring transfer members among the plurality of transfer members, and

wherein the second direction switching member locates the chemical container (2) transferred from the first direction switching member (143) on the second transfer line (200) and then drives the second lifting portion to mount the chemical container (2) on the transfer member of the second transfer line (200).

[Claim 20]

The automatic chemical container transfer device of claim 17, wherein the first transfer line connection portion (140) comprises a pair of lateral frames (142-1),

(142-2) configured to support ends of both sides of the plurality of transfer members (141) configured to transfer the chemical container (2) toward the first transfer line (100),

wherein the first direction switching member (143) further protrudes outward from the lateral frame (142-1) provided on the second transfer line (200) between the lateral frames (142-1), (142-2),

wherein the second transfer line connection portion (240) comprises a pair of lateral frames configured to support ends of both sides of the plurality of transfer members configured to transfer the chemical container (2) toward the second transfer line; and

wherein the second direction switching member protrudes further outward from the lateral frame provided on the first transfer line between the lateral frames of the second transfer line connection portion (240) so that the first direction switching member (143) and the second direction switching member continuously transfer the chemical container (2).

[Claim 21]

The automatic chemical container transfer device of claim 2, wherein a second inspection portion (230) configured to inspect chemical information of the chemical container (2) loaded through the outlet portion (210) is provided at a position on the second transfer line (200) which corresponds to the first inspection portion (130).

[Claim 22]

The automatic chemical container transfer device of claim 21, wherein when the chemical container (2) is loaded on the second transfer line (200) through the outlet portion (210), the chemical container (2) is inspected by the second inspection

portion (230), passes through the first transfer line (100), and is transferred to the chemical supply device (5).

[Claim 23]

An automatic chemical container transfer device comprising:

at least one transfer line configured to transfer a chemical container (2) loaded on an inlet portion (110) to a chemical supply device (5);

a first inspection portion (130) configured to inspect chemical information of the chemical container (2) transferred through the transfer line;

a control portion configured to receive chemical information of the chemical container (2) transferred through the transfer line from the first inspection portion (130) and to control the chemical container (2) to be supplied to the chemical supply device (5) when the received chemical information coincides with information required in the chemical supply device (5); and

an air shower portion (310) configured to spray air to remove foreign substances on an exterior of the chemical container (2) which has passed through the first inspection portion (130).

[Claim 24]

The automatic chemical container transfer device of claim 2, wherein at least one buffer portion (301), (302), (303), (304), on which the chemical container (2) which has passed through the first inspection portion (130) stands by temporarily before being supplied to the chemical supply device (5), is provided on the transfer line.

[Claim 25]

The automatic chemical container transfer device of claim 24, wherein the at least one transfer line further comprises:

a third transfer line (300) connected to the first transfer line (100) vertically and comprising a chemical container inlet port (331) configured to load the chemical container (2) on the chemical supply device (5); and

a fourth transfer line (400) disposed to be parallel and adjacent to the third transfer line (300) and connected to an end of the first transfer line (100).

[Claim 26]

The automatic chemical container transfer device of claim 25, wherein the buffer portions (301), (302), (303), (304) are provided on the third transfer line (300) and the fourth transfer line (400).

[Claim 27]

The automatic chemical container transfer device of claim 25, wherein the buffer portions (301), (302), (303), (304) comprise:

a first buffer portion (301) and a second buffer portion (302) provided on one side and the other side of the chemical container inlet port (331) on the third transfer line (300), respectively; and

a fourth buffer portion (304) provided at a position corresponding to the first buffer portion (301) and a third buffer portion (303) provided at a position corresponding to the second buffer portion (302), and the positions being on the fourth transfer line (400).

[Claim 28]

The automatic chemical container transfer device of claim 25, wherein at least two connection portions (320), (420); (330), (430); (340), (440) which are configured to transfer the chemical container (2) from the third transfer line (300) to the fourth transfer line (400) or to transfer the chemical containers (2) from the

fourth transfer line (400) to the third transfer line (300) are provided between the third transfer line (300) and the fourth transfer line (400).

[Claim 29]

The automatic chemical container transfer device of claim 28, wherein the at least two connection portions (320), (420); (330), (430); (340), (440) comprise fourth connection portions (320), (420) configured to connect sides of the third transfer line (300) and the fourth transfer line (400), which are close to the first transfer line (100) and comprise sixth connection portions (340), (440) configured to connect ends of the third transfer line (300) and the fourth transfer line (400), which are far from the first transfer line (100),

wherein the sixth connection portions (340), (440) are used for transferring the chemical container (2) of which all chemicals are used in the chemical supply device (5) in a direction from the third transfer line (300) to the fourth transfer line (400), and

wherein the fourth connection portions (320), (420) are used for supplying the chemical container (2), which stands by temporarily on the buffer portion provided on the fourth transfer line (400), to the chemical supply device (5) through the third transfer line (300).

[Claim 30]

The automatic chemical container transfer device of claim 25, wherein the third transfer line (300) and the fourth transfer line (400) perpendicularly intersect the first transfer line (100).

[Claim 31]

The automatic chemical container transfer device of claim 25, wherein third connection portions (160), (260) configured to connect ends of the first transfer line (100) and the second transfer line (200) to each other are provided, and

wherein the chemical container (2) of which all chemicals are used in the chemical supply device (5) passes through the third connection portions (160), (260) through the fourth transfer line (400) and is discharged outward through the second transfer line (200).

[Claim 32]

The automatic chemical container transfer device of claim 25, wherein second connection portions (150), (250) and third connection portions (160), (260) which are configured to connect the first transfer line (100) to the second transfer line (200) and to switch the transfer direction of the chemical container (2) are provided, and

wherein the second connection portions (150), (250) are connected to the third transfer line (300), and the third connection portions (160), (260) are connected to the fourth transfer line (400).

[Claim 33]

The automatic chemical container transfer device of claim 1, further comprising a transfer vehicle (600) configured to reciprocate along transfer vehicle rails (500) provided between the transfer line and the chemical supply device (5) and comprising a transfer member configured to transfer the chemical container (2) to deliver the chemical container (2) from the transfer line to the chemical supply device (5).

[Claim 34]

The automatic chemical container transfer device of claim 33, wherein a plurality of such transfer vehicles (600) are provided on the transfer vehicle rails (500).

[Claim 35]

The automatic chemical container transfer device of claim 34, wherein the plurality of transfer vehicles (600) are provided, the chemical container (2) is loaded on the chemical supply device (5) using one transfer vehicle (600), and an empty chemical container (2), of which all chemicals have been used in the chemical supply device (5), is transferred to the transfer line using another transfer vehicle (600).

[Claim 36]

The automatic chemical container transfer device of claim 1, wherein when a plurality of such chemical supply devices (5) are provided, the control portion controls such that the chemical containers (2) having chemical information which coincides with that needed by each of the plurality of chemical supply devices (5) are supplied to the plurality of chemical supply devices (5).

[Claim 37]

The automatic chemical container transfer device of claim 1, wherein when the chemical container (2) cannot be discharged through the outlet portion (210) or the second transfer line (200), the chemical container (2) is discharged through the inlet portion (110).

[Claim 38]

A method of automatically transferring a chemical container, the method comprising:

loading a chemical container (2) on an inlet portion (110);

transferring the chemical container (2) through at least one transfer line; and

receiving chemical information of the transferred chemical container (2) and supplying the chemical container (2) to a chemical supply device (5) when the received chemical information coincides with information needed by the chemical supply device (5);

wherein the at least one transfer line comprises a first transfer line (100) connected to the inlet portion (110) and comprises a second transfer line (200) disposed to be parallel and adjacent to the first transfer line (100) and provided on the side of the inlet portion (110) and connected to the outlet portion (210) for discharging the chemical container that has been used in the chemical supply device (5); and determines whether the chemical information of the chemical container (2) transferred through the first transfer line (100) matches the information required by the chemical supply device (5).

[Claim 39]

The method of claim 38, wherein the chemical information is inspected by a first inspection portion (130) provided on the first transfer line (100).

[Claim 40]

The method of claim 39, wherein when an abnormality in the chemical information is detected as a result of inspection using the first inspection portion (130), the chemical container (2) is discharged through the outlet portion (210).

[Claim 41]

The method of claim 40, wherein when an abnormality in the chemical information is detected as a result of inspection using the first inspection portion (130), the chemical container (2) is switched in a transfer direction and then is discharged through the outlet portion (210).

[Claim 42]

The method of claim 38, wherein the chemical container (2) transferred through the first transfer line (100) or the second transfer line (200) is aligned by an alignment portion.

[Claim 43]

The method of claim 38, wherein at least one buffer portion (301), (302), (303), (304) on which a plurality of chemical containers (2) stand by temporarily on the at least one transfer line and when all chemicals in the chemical container (2) which has been loaded on the chemical supply device (5) are used, the standing-by chemical containers (2) on the buffer portion (301), (302), (303), (304) are loaded on the chemical supply device (5).