[CLAIMS]

[Claim 1]

A chemical filter replacement device comprising:

a head clamp (310) composed of a first clamp (311) and a second clamp (312) provided to face each other in order to clamp a filter housing (20) for accommodating a cartridge used to filtrate chemicals and a filter head (30) coupled to an open side of the filter housing (20);

a clamp locking means configured to fix a position at which the head clamp (310) is clamped to maintain a state in which the filter housing (20) and the filter head (30) are clamped;

a clamp transfer portion (320) configure to transfer the first clamp (311) and the second clamp (312) in a direction to become closer to each other or in a direction to become farther away from each other; and

the clamp locking means includes a clamp fixing portion (340) configured to be moved to the clamp transfer portion (320) in a state spaced apart from the clamp transfer portion (320) to be fixed at the clamped positions of the first clamp (311) and the second clamp (312) to prevent them from moving away from each other.

[Claim 2]

The chemical filter replacement device of claim 1, further comprising a filter assembly holding portion (300) on which a filter assembly (2) comprising a first cartridge (10-1) to be used to filtrate chemicals or a second cartridge (10-2) which has been used to filtrate chemicals, the filter housing (20) configured to accommodate the first cartridge (10-1)

or the second cartridge (10-2) and vertically coupled, and the filter head (30) is mounted; and

cartridge replacement means configured to separate the filter housing (20) from the filter assembly (2) while the filter assembly (2) is placed on the filter assembly holding portion (300) and to couple the separated filter housing (20) to the filter assembly (2) when the second cartridge (10-2) is separated from the filter assembly (2) and the first cartridge (10-1) is coupled to the filter assembly (2) from which the second cartridge (10-2) is separated.

[Claim 3]

The chemical filter replacement device of claim 2, further comprising a first loading portion (210) on which the first cartridge (10-1) to be coupled to the filter assembly (2) is mounted and a second loading portion (220) on which the second cartridge (10-2) separated from the filter assembly (2) is mounted.

[Claim 4]

The chemical filter replacement device of claim 3, wherein the first loading portion (210) comprises a first cartridge mount (211) on which the first cartridge (10-1) is mounted, and

wherein the second loading portion (220) comprises a second cartridge mount (221) on which the second cartridge (10-2) is mounted.

[Claim 5]

The chemical filter replacement device of claim 3, wherein a pair of such first loading portions (210), a pair of such filter assembly holding portions (300), and a pair of such second loading portions (220) are provided at positions spaced apart bidirectionally.

[Claim 6]

The chemical filter replacement device of claim 5, wherein a door (110) is provided in front of the first loading portions (210), and

wherein the first loading portions (210), the filter assembly holding portions (300), and the second loading portions (220) are sequentially arranged at positions spaced at certain intervals apart backward from the door (110).

[Claim 7]

The chemical filter replacement device of claim 6, wherein the first loading portions (210) and the second loading portions (220) are provided to be located within a range where a hand of a worker reaches on the basis of the door (110).

[Claim 8]

The chemical filter replacement device of claim 1, wherein the filter head (30) is coupled to one open end of the filter housing (20) and comprises a plurality of connection portions (31 to 34) formed to allow the chemicals to flow thereinto or discharged therefrom.

[Claim 9]

The chemical filter replacement device of claim 1, wherein a head flange (36) formed along a perimeter of one end of the filter head (30) and a housing flange (22) formed along a perimeter of one end of the filter housing (20) are coupled to each other while mutually facing surfaces thereof come into contact with each other, and

wherein the head clamp (310) pressurizes the facing surfaces of the head flange (36) and the housing flange (22) in a direction to be pressed against each other to perform clamping.

[Claim 10]

The chemical filter replacement device of claim 9, wherein the head flange (36) and the housing flange (22) have tilted-wedge-shaped surfaces opposite the mutually facing surfaces thereof, and

wherein the head clamp (310) comprises coupling grooves (311a), (312b) having tilted surfaces (311b), (312b), respectively, to be pressed against the tilted surfaces of the head flange (36) and the housing flange (22).

[Claim 11]

The chemical filter replacement device of claim 9, wherein when the first clamp (311) and the second clamp (312) are transferred in the direction to become closer to each other, the head flange (36) and the housing flange (22) become a clamped state, and

wherein when the first clamp (311) and the second clamp (312) are transferred in the direction to become farther away from each other, the head flange (36) and the housing flange (22) become released from the clamped state.

[Claim 12]

The chemical filter replacement device of claim 1, wherein the head clamp (310) comprises a first clamp (311) and a second clamp (312) which are located on perimeters of the head flange (36) and the housing flange (22) to face each other, and

further comprising a clamp transfer portion (320) configure to transfer the first clamp (311) and second clamp (312) in a direction to become closer to each other or in a direction to become farther away from each other, and

wherein the clamp locking means comprises the clamp fixing portion (340)

comprising a fixing groove (324) formed in the clamp transfer portion (320) and a fixing protrusion (341) inserted into the fixing groove (324) while the head flange (36) and the housing flange (22) are clamped.

[Claim 13]

The chemical filter replacement device of claim 12, wherein the clamp transfer portion (320) is configured to be laterally movable back and forth, and

wherein the clamp fixing portion (340) is configured to be longitudinally movable back and forth.

[Claim 14]

The chemical filter replacement device of claim 13, wherein while the head flange (36) and the housing flange (22) are clamped, the clamp fixing portion (340) is moved downward and the fixing protrusion (341) is inserted into the fixing groove (324) so that the head clamp (310) is clamped and locked, and

wherein when the clamp fixing portion (340) is moved upward and the fixing protrusion (341) is located outside the fixing groove (324), the head clamp (310) is released from being clamped and locked.

[Claim 15]

The chemical filter replacement device of claim 2, wherein the cartridge replacement means comprises at least one filter housing attachment/detachment module (400) configured to separate the filter housing (20) surrounding the second cartridge (10-2) from the filter assembly (2) or to couple the filter housing (20) separated from the filter assembly (2) to surround the first cartridge (10-1).

[Claim 16]

The chemical filter replacement device of claim 15, wherein the filter housing attachment/detachment module (400) comprises a housing fixing portion (410) to which the filter housing (20) is fixed and a housing transfer portion (420) configured to vertically move the housing fixing portion (410).

[Claim 17]

The chemical filter replacement device of claim 16, wherein the filter housing attachment/detachment module (400) further comprises a housing fixing portion height adjustment portion (430) configured to adjust a height of the housing fixing portion (410) according to a height specification of the filter housing (20).

[Claim 18]

The chemical filter replacement device of claim 3, wherein the cartridge replacement means comprises a second cartridge transfer module (500) configured to transfer the second cartridge (10-2) placed on the filter assembly holding portion (300) to the second loading portion (220).

[Claim 19]

The chemical filter replacement device of claim 18, wherein the second loading portion (220) is provided at a position spaced toward one side apart from a back of the filter assembly holding portion (300).

[Claim 20]

The chemical filter replacement device of claim 19, wherein the second cartridge transfer module (500) comprises a rotation portion (520) configured to be rotatable between a first position at which the filter assembly holding portion (300) is located and a second

position at which the second loading portion (220) is located, a second lift-transfer portion (530) configured to vertically move a second lifting portion (540) upward or downward from the first position or the second position, and a second gripper (550) provided in the second lifting portion (540) to grip the second cartridge (10-2).

[Claim 21]

The chemical filter replacement device of claim 20, wherein a pair of such filter assembly holding portions (300) and a pair of such second loading portions (220) are provided at positions spaced apart bidirectionally, and

wherein the second cartridge transfer module (500) is provided as a single module and is configured to transfer the second cartridge (10-2) between the filter assembly holding portions (300) and the second loading portions (220) which are located on both sides.

[Claim 22]

The chemical filter replacement device of claim 21, wherein the second cartridge transfer module (500) transfers the second cartridge (10-2) from the filter assembly holding portion (300) to the second loading portion 220 and then returns to a standby position located in the middle of the second loading portions (220) located on both sides.

[Claim 23]

The chemical filter replacement device of claim 20, wherein the second cartridge transfer module (500) further comprises a second lifting portion height adjustment portion (560) configured to adjust a height of the second lifting portion (540) according to a height specification of the second cartridge (10-2).

[Claim 24]

The chemical filter replacement device of claim 3, wherein the cartridge replacement

means comprises a first cartridge transfer module (600) configured to transfer the first cartridge (10-1) loaded on the first loading portion (210) to the filter assembly holding portion (300).

[Claim 25]

The chemical filter replacement device of claim 24, wherein the first loading portion (210) and the filter assembly holding portion (300) are provided at positions spaced in front or behind on a linear path.

[Claim 26]

The chemical filter replacement device of claim 25, wherein the first cartridge transfer module (600) comprises a first lift-transfer portion (610) configured to vertically move, upward or downward, a first lifting portion (620), a forward/backward transfer portion (630) provided below the first lifting portion (620) to move forward or backward, and a first gripper (640) provided on the forward/backward transfer portion (630) to grip the first cartridge (10-1).

[Claim 27]

The chemical filter replacement device of claim 26, wherein the forward/backward transfer portion (630) comprises a first forward/backward transfer portion (630-1) coupled to a bottom of the first lifting portion (620) and moved forward or backward along the first lifting portion (620) and a second forward/backward transfer portion (630-2) coupled to a bottom of the first forward/backward transfer portion (630-1), moved forward or backward along the first forward/backward transfer portion (630-1), and having a bottom to which the first gripper (640) is coupled.

[Claim 28]

The chemical filter replacement device of claim 26, wherein the first cartridge transfer module (600) further comprises a first lifting portion height adjustment portion (650) configured to adjust a height of the first lifting portion (620) according to a height specification of the first cartridge (10-1).

[Claim 29]

The chemical filter replacement device of claim 3, wherein the second loading portion (220) comprises a chemical support (230) configured to accommodate chemicals dropped from the second cartridge (10-2) and to discharge the chemicals through one side when the second cartridge (10-2) is transferred or the worker opens the door (110) and manually unloads the second cartridge (10-2).

[Claim 30]

The chemical filter replacement device of claim 3, wherein the cartridge replacement means comprises a second cartridge transfer module (500-1) configured to transfer the second cartridge (10-2) placed on the filter assembly holding portion 300 to the second loading portion (220) and a first cartridge transfer module (600-1) configured to transfer the first cartridge (10-1) loaded on the first loading portion (210) to the filter assembly holding portion (300), and

wherein the second cartridge transfer module (500-1) and the first cartridge transfer module (600-1) are configured to be movable forward or backward and upward or downward.

[Claim 31]

The chemical filter replacement device of claim 2, wherein a pair of loading portions (200) on which the first cartridge (10-1) and the second cartridge (10-2) are loaded and a pair of such filter assembly holding portions (300) are provided on both sides,

the chemical filter replacement device comprising a cartridge transfer module (600-2) configured to transfer the filter assembly (2) between the loading portions (200) and the filter assembly holding portions (300), and

wherein the cartridge transfer module (600-2) is configured to be rotatable bidirectionally and movable upward or downward to be used by the two filter assemblies (2) in common.

[Claim 32]

The chemical filter replacement device of claim 2, wherein a pair of loading portions (200) on which the first cartridge (10-1) and the second cartridge (10-2) are loaded and a pair of such filter assembly holding portions (300) are provided on both sides,

the chemical filter replacement device comprising a cartridge transfer module (600-3) configured to transfer the filter assembly (2) between the loading portions (200) and the filter assembly holding portions (300), and

wherein the cartridge transfer module (600-3) comprises a lift-transfer portion (610-3), a first linear transfer portion (620-3) configured to transfer the lift-transfer portion (610-3) in a front-rear direction between the loading portions (200) and the filter assembly holding portions (300), and a second linear transfer portion (630-3) configured to transfer the lift-transfer portion (610-3) and the first linear transfer portion (620-3) in a right-left direction between the pair of loading portions (200) and the pair of filter assembly holding portions (300) which are provided on both sides.

[Claim 33]

The chemical filter replacement device of claim 2, wherein the filter head (30) comprises a first connection portion (31) into which chemicals flow, a second connection

portion (32) through which chemicals which have passed through the first cartridge (10-1) or the second cartridge (10-2) are discharged, a third connection portion (33) configured to discharge chemicals remaining in a space (S2) between the first cartridge (10-1) or the second cartridge (10-2) and an inner surface of the filter housing (20), and a fourth connection portion (34) configured to discharge chemicals remaining in an internal space (S1) of the first cartridge (10-1) or the second cartridge (10-2), and

wherein the filter housing (20) comprises a fifth connection portion (23) configured to supply dry air or cleaning water to an inside of the filter housing (20).

[Claim 34]

The chemical filter replacement device of claim 33, wherein a pair of such filter assembly holding portions (300) are provided to be spaced apart on both sides, and

wherein a dry air supply line (L6), a cleaning water supply line (L7), and a common vent line (L8) configured to communicate with outside air are connected to the fifth connection portion (23) of the filter assembly (2) placed on each of the pair of filter assembly holding portions (300).

[Claim 35]

The chemical filter replacement device of claim 34, wherein a bypass line (L9) configured to selectively supply chemicals to any one of a pair of such filter assemblies (2) is connected to the pair of filter assemblies (2).

[Claim 36]

The chemical filter replacement device of claim 2, wherein a pressure sensor (P) configured to measure pressure inside the filter assembly (2) after replacement with the first cartridge (10-1) is connected to the filter assembly (2).