[CLAIMS]

[Claim 1]

A locking device for supplying a chemical, the locking device comprising:

a drive unit that provides a driving force;

a first locking part (330) and a second locking part (340) of which positions are changed between a locked position in which a position of a locked object is fixed and an unlocked position in which movement of the locked object is allowed; ~~and~~

at least one link member configured to transfer the driving force of the drive unit (310) to the first locking part (330) and the second locking part (340); and

a first link pin (324) that is linearly moved by the drive unit,

wherein the at least one link member includes a second link member (322) and a third link member (323) that are rotated by the linear movement of the first link pin (324).

[Claim 2]

The locking device of claim 1, wherein the first locking part (330) and the second locking part (340) are provided to face each other in a vertical direction and are locked by coming into contact with both sides of the locked object.

[Claim 3]

The locking device of claim 2, wherein the first locking part (330) includes a first locking member (331) coming into contact with one side of the locked object to be in a locked state and a first connection rod (332) hinge-connected to the other end of the second link member (322), and

the second locking part (340) includes a second locking member (341) coming into contact with the other side of the locked object to be in a locked state and a second connection rod (342) hinge-connected to the other end of the third link

member (323).

[Claim 4]

The locking device of claim 3, further comprising:

a second link pin (334) that includes a first hinge shaft (334c) hinge-connected to the second link member (322) and a first insertion groove (334b) formed in a direction perpendicular to the first hinge shaft 334c, the first connection rod (332) being inserted into the first insertion groove (334b);

a first coupling member (335) that prevents the first connection rod (332) from being separated from the first insertion groove (334b) by covering an upper portion of the first insertion groove (334b) into which the first connection rod (332) is inserted;

a third link pin (344) that includes a second hinge shaft hinge-connected to the third link member (323) and a second insertion groove formed in a direction perpendicular to the second hinge shaft, the second connection rod (342) being inserted into the second insertion groove; and

a second coupling member (345) that prevents the second connection rod (342) from being separated from the second insertion groove by covering an upper portion of the second insertion groove into which the second connection rod (342) is inserted.

[Claim 5]

The locking device of claim 4, wherein:

a first link pin coupling part (333) having a diameter that is larger than a diameter of the first connection rod (332) is integrally formed at an end of the first connection rod (332);

a second link pin coupling part (343) having a diameter that is larger than a

diameter of the second connection rod (342) is integrally formed at an end of the second connection rod (342);

the first link pin coupling part (333) is caught by the first coupling member (335) and is thus prevented from being removed through the first insertion groove (334b); and

the second link pin coupling part (343) is caught by the second coupling member (335) and is thus prevented from falling out of the second insertion groove.

~~[Claim 6]~~

~~The locking device of claim 1, further comprising a first link pin (324) that is linearly moved by the drive unit,~~

~~wherein the at least one link member includes a second link member (322) and a third link member (323) that are rotated by the linear movement of the first link pin (324).~~

[Claim ~~7~~6]

The locking device of claim ~~6~~ 1, wherein each of the first locking part (330) and the second locking part (340) has, as a rotation center, a fixed position of one end in contact with the locked object, and

the first locking part (330) and the second locking part (340) rotate about the fixed position by the rotational movements of the second link member (322) and the third link member (323) and thus are changed between the locked position and the unlocked position.

[Claim ~~8~~7]

The locking device of claim ~~6~~ 1, further comprising a first link member (321) that is linearly moved in a horizontal direction by the drive unit,

wherein the linear movement of the first link pin (324) in a vertical direction

is performed by the linear movement of the first link member (321), and the rotational movements of the second link member (322) and the third link member (323) are performed by the linear movement of the first link pin (324).

[Claim ~~9~~8]

The locking device of claim ~~8~~7, wherein a slot (321a) having a length in an inclined direction with respect to a horizontal direction is formed in the first link member (321), and

the first link pin (324) is moved between one side and the other side in the slot (321a).

[Claim ~~10~~9]

The locking device of claim ~~9~~8, wherein a linear part is formed at an upper end of the slot (321a) in a direction parallel to a horizontal direction, and

when the first locking part (330) and the second locking part (340) are in the locked positions, the first link pin (324) is located in the linear part (321b).

[Claim ~~11~~10]

The locking device of claim ~~6~~ 1, wherein the first link member (322) and the third link member (323) rotate symmetrically with respect to a vertical direction.

[Claim ~~12~~11]

The locking device of claim ~~11~~10, wherein one ends of the first link member (322) and the third link member (323) are hinge-connected by the first link pin (324), and

when a position is changed between the locked position and the unlocked position, the second link member (322) and the third link member (323) rotate symmetrically about the first link pin (324).

[Claim ~~13~~12]

The locking device of claim ~~6~~ 1, wherein the linear movement of the first link pin (324) is guided by a guide part (350) having a vertical length.

[Claim ~~14~~13]

The locking device of claim ~~6~~ 1, wherein:

the drive unit is a rotating cylinder;

a first link member (321-3) rotating about a drive hinge shaft by driving of the drive unit is provided;

the first link pin (324) is coupled to the other end of the first link member (321-3); and

the first link pin (324) is linearly moved along a guide part (350-3) in a vertical direction by the rotation of the first link member (321-3).

[Claim ~~15~~14]

The locking device of claim ~~6~~ 1, wherein the first link pin (324) is coupled to guide connection members (351-1, 351-2), and

when the drive unit is driven, the guide connection members (351-1, 351-2) are vertically moved while being guided by cylinder guides (312-1, 312-2) having a vertical length.

[Claim ~~16~~15]

The locking device of claim ~~15~~14, wherein:

the drive unit is a cylinder that allows the linear movement using a pressure of a fluid;

the drive unit operates in any one of an automatic mode in which the first link pin (324) is linearly moved by driving of the cylinder and a manual mode in which when the driving force is not applied, the first link pin (324) is manually moved; and

in the manual mode, a locking member (319-2) is provided to manually

change the positions of the first locking part (330) and the second locking part (340) by discharging the fluid inside the cylinder to an outside.

[Claim ~~17~~16]

The locking device of claim ~~16~~15, wherein:

the locking member (319-2) includes a lock nut;

when the lock nut is loosened, the fluid inside the cylinder is discharged to the outside, and thus the manual mode is performed; and

when the lock nut is locked, the fluid inside the cylinder is not discharged, and thus the first link pin 324 does not descend and is maintained in a stationary state at a certain position.

[Claim ~~18~~17]

The locking device of claim ~~15~~14, wherein:

the drive unit operates in any one of an automatic mode in which the first link pin (324) is linearly moved by the driving force and a manual mode in which when the driving force is not applied, the first link pin (324) is manually moved; and

the guide connection members (351-1, 351-2) are provided with handles to linearly move the first link pin (324) to operate in the manual mode.

[Claim ~~19~~18]

The locking device of claim ~~6~~ 1, wherein:

the drive unit operates in any one of an automatic mode in which the first link pin (324) is linearly moved by the driving force and a manual mode in which when the driving force is not applied, the first link pin (324) is manually moved; and

the at least one link member is provided with a handle to linearly move the first link pin (324) to operate in the manual mode.

[Claim ~~20~~19]

The locking device of claim 1, further comprising:

locking detection sensors (361, 362) that detect whether at least one of the first locking part (330) and the second locking part (340) is in the locked position; and

unlocking detection sensors (363, 364) that detect whether the at least one of the first locking part (330) and the second locking part (340) is in the unlocked position.

[Claim ~~21~~20]

The locking device of claim ~~20~~19, wherein the locked object is a chemical male connector inserted into a chemical female connector, and

when the locking detection sensors (361, 362) detect that the at least one of the first locking part (330) and the second locking part (340) is in the locked position, a controller controls a chemical to flow through the chemical male connector and the chemical female connector.

[Claim ~~22~~21]

The locking device of claim ~~20~~19, wherein, when the unlocking detection sensors (361, 362) detect that the at least one of the first locking part (330) and the second locking part (340) is in the unlocked position, the controller controls the locked object to move.

[Claim ~~23~~22]

The locking device of claim 1, wherein the drive unit operates in an automatic mode in which positions of the first locking part (330) and the second locking part (34) are changed by the driving force or in a manual mode in which when the driving force is not applied, the positions of the first locking part (330) and the second locking part (340) are manually changed.

[Claim ~~24~~23]

The locking device of claim ~~23~~22, wherein the drive unit includes a cylinder which changes the positions of the first locking part (330) and the second locking part (340) using a pressure of a fluid.

[Claim ~~25~~24]

The locking device of claim ~~24~~23, wherein the drive unit comprises:

a drive connection member that is linearly moved by driving of the drive unit;

a first fluid supply part (313) that supplies the fluid so that the drive connection member linearly moves in one direction;

a second fluid supply part (314) that supplies the fluid so that the drive connection member linearly moves in the other direction; and

a neutral part (312) that implements the manual mode as the fluid is discharged even when the drive connection member linearly moves in either the one direction or the other direction.

[Claim ~~26~~25]

The locking device of claim ~~25~~24, wherein:

the first fluid supply part (313) and the second fluid supply part (314) are integrally provided on both sides of the neutral part (312) interposed therebetween; and

a pair of springs (315a, 315b) are provided at side portions of the first fluid supply part (313) and the second fluid supply part (314) so that elastic forces are applied in opposite directions.

[Claim ~~27~~26]

The locking device of claim ~~25~~24, wherein, by applying electricity, the neutral part (312), the first fluid supply part (313), and the second fluid supply part

(314) are integrally moved, and thus any one of the first fluid supply part (313) and the second fluid supply part (314) is connected to a first connection opening (316) and a second connection opening (317), through which the fluid is introduced and discharged, to move the drive connection member (311) in the one direction or the other direction.

[Claim ~~28~~27]

An automatic chemical supply apparatus having the locking device for supplying a chemical of any one of claims 1 to ~~27~~26.