

CLAIMS

[Claim 1]

Connection equipment comprising:

- 5 an equipment connector comprising a first connecting section that is connectable to equipment through which a fluid moves, a first liquid flow path that communicates with an interior of the equipment when the equipment is connected to the first connecting section, and a first
- 10 valve that is to open and close the first liquid flow path and that opens when pressed,
- a container connector comprising a second connecting section that is connectable to a container, a second liquid flow path that communicates with an interior of the
- 15 container when the container is connected to the second connecting section, and a second valve that is to open and close the second liquid flow path and that opens when pressed by the first valve, and
- a lock mechanism that locks the equipment connector and the
- 20 container connector in a state where the first valve is pressed by the second valve, the first valve and the second valve are opened and the first liquid flow path is in communication with the second liquid flow path, and that unlocks the connectors in a state where the first valve and
- 25 the second valve are closed, wherein the equipment connector comprises a pressure adjustment section, and a first gas flow path connected to the pressure adjustment

section,

the first valve is to open and close the first liquid flow path and the first gas flow path,

the container connector comprises a second gas flow path that communicates with the interior of the container when the container is connected to the second connecting section,

the second valve is to open and close the second liquid flow path and the second gas flow path, and

the lock mechanism locks the equipment connector and the container connector in a state where the first valve is pressed by the second valve, the first valve and the second valve are opened, the first liquid flow path is in communication with the second liquid flow path, and the first gas flow path is in communication with the second gas flow path, and the lock mechanism unlocks the connectors in a state where the first valve and the second valve are closed, and wherein the equipment connector further comprises a fixed body in which the first connecting section is formed,

a needle fixed to the fixed body, formed with the first liquid flow path therein, and having a first opening on a tip side,

a first seal made of a resin and supported by the fixed body movably between a position to liquid-tightly seal the first opening of the needle and a position through which the needle extends, and

a moving body storing the needle and the first seal therein, having a second opening that is air-tightly sealable with the first seal on the tip side of the needle, forming a part of the first gas flow path between the fixed
5 body and the moving body, and supported by the fixed body movably in an axial direction of the needle between a position where the second opening is air-tightly sealed with the first seal in a state where the first opening of the needle is sealed with the first seal and a position
10 where the sealing of the second opening with the first seal is released,

the first seal and the needle constitute the first valve,

the container connector comprises a first member
15 formed with the second liquid flow path therein, and having a third opening that communicates with the second liquid flow path at a tip,

a tubular second member storing the first member therein, forming a part of the second gas flow path between
20 a tip of the first member and the second member, and having a fourth opening at a tip, and

a second seal made of a resin as the second valve, formed in a bottomed tubular shape having a bottom that seals the fourth opening of the second member, and
25 including the first member fitted therein, and

the lock mechanism comprises a first engaging section formed in the moving body, and

a first engaged section formed in the second member,
and engaged with the first engaging section in a state
where the first seal is pressed by the second seal to move
the first seal and the second seal and unseal the second
5 opening and the fourth opening so that the first gas flow
path communicates with the second gas flow path, the third
opening is liquid-tightly sealed with the bottom, the
needle extends through the first seal and the second seal
and the first liquid flow path is in communication with the
10 second liquid flow path, to fix the equipment connector and
the container connector.

[Claim 2]

The connection equipment according to claim 1, wherein
the fixed body comprises an abutment section for the fixed
15 body which abuts on the first engaging section in a state
where the second opening of the moving body is sealed with
the first seal, to move the first engaging section to a
position where the first engaging section disengages from
the first engaged section.

20 [Claim 3]

The connection equipment according to claim 1 or 2,
comprising:

a second engaging section formed in the moving body,
a second engaged section formed in the fixed body, and
25 engaged with the second engaging section in a state where
the moving body is present at a position where the second
opening is sealed with the first seal, to regulate the

movement of the moving body, and

an abutment section for the moving body which is formed in the second member, and abuts on the second engaging section in a state where the second seal is in contact closely with the first seal, to move the second engaging section to a position where the second engaging section disengages from the second engaged section.

[Claim 4]

The connection equipment according to claim 3, wherein the moving body comprises a tubular head sleeve, and

a stopper sleeve fixed to the head sleeve, and comprising a first arm as the second engaging section extending in an axial direction of the fixed body, a second arm as the first engaging section extending in the axial direction of the fixed body, and a coupling section that couples the first arm and the second arm, the first arm, the second arm and the coupling section being annularly arranged, and the first arm and the second arm being tiltable toward an axis of the head sleeve,

the fixed body is formed in a tubular shape that stores the head sleeve and the stopper sleeve therein, and comprises, in an inner peripheral surface, a locking protrusion as the second engaged section that is abutable on the first arm in an axial direction of the fixed body, and an unlocking protrusion that abuts on the second arm in a state where the second opening is sealed with the first seal, to tilt the second arm to a position where the second

arm disengages from the first engaged section, and

the second member comprises the abutment section for the moving body in an outer peripheral surface, and in the outer peripheral surface, a locking recess as the first engaged section in which the second arm is engageable is formed.

[Claim 5]

An equipment connector comprising:

a first connecting section that is connectable to equipment through which a fluid moves,

a first liquid flow path that communicates with an interior of the equipment when the equipment is connected to the first connecting section,

a first valve that is to open and close the first liquid flow path and that opens when pressed,

a lock mechanism that locks a container connector in a state where the first valve is pressed by a second valve of the container connector, the first valve and the second valve are opened and the first liquid flow path is in communication with a second liquid flow path of the container connector, and that unlocks the container connector in a state where the first valve and the second valve are closed,

a pressure adjustment section, and

a first gas flow path connected to the pressure adjustment section, wherein the first valve is to open and close the first liquid flow path and the first gas flow

path, and

the lock mechanism locks the container connector in a state where the first valve is pressed by the second valve of the container connector, the first valve and the second
5 valve are opened, the first liquid flow path is in communication with the second liquid flow path of the container connector, and the first gas flow path is in communication with a second gas flow path of the container connector, and the lock mechanism unlocks the container
10 connector in the state where the first valve and the second valve are closed,

wherein the equipment connector further comprises a fixed body in which the first connecting section is formed,
a needle fixed to the fixed body, formed with the
15 first liquid flow path therein, and having a first opening on a tip side,

a first seal made of a resin and supported by the fixed body movably between a position to liquid-tightly seal the first opening of the needle and a position through
20 which the needle extends, and

a moving body storing the needle and the first seal therein, having a second opening that is air-tightly sealable with the first seal on the tip side of the needle, forming a part of the first gas flow path between the fixed
25 body and the moving body, and supported by the fixed body movably in an axial direction of the needle between a position where the second opening is air-tightly sealed

with the first seal in a state where the first opening of the needle is sealed with the first seal and a position where the sealing of the second opening with the first seal is released,

5 the first seal and the needle constitute the first valve,

 the container connector comprises a first member formed with the second liquid flow path therein, and having a third opening that communicates with the second liquid
10 flow path at a tip,

 a tubular second member storing the first member therein, forming a part of the second gas flow path between a tip of the first member and the second member, and having a fourth opening at a tip, and

15 a second seal made of a resin as the second valve, formed in a bottomed tubular shape having a bottom that seals the fourth opening of the second member, and including the first member fitted therein, and

 the lock mechanism comprises a first engaging section
20 formed in the moving body, and

 a first engaged section formed in the second member, and engaged with the first engaging section in a state where the first seal is pressed by the second seal to move the first seal and the second seal and unseal the second
25 opening and the fourth opening so that the first gas flow path communicates with the second gas flow path, the third opening is liquid-tightly sealed with the bottom, the

needle extends through the first seal and the second seal and the first liquid flow path is in communication with the second liquid flow path, to fix the equipment connector and the container connector.

5 [Claim 6]

Connection equipment comprising:

an equipment connector comprising a first connecting section that is connectable to equipment through which a fluid moves, a first liquid flow path that communicates
10 with an interior of the equipment when the equipment is connected to the first connecting section, and a first valve that is to open and close the first liquid flow path and that opens when pressed,

a container connector comprising a second connecting section that is connectable to a container, a second liquid
15 flow path that communicates with an interior of the container when the container is connected to the second connecting section, and a second valve that is to open and close the second liquid flow path and that opens when
20 pressed by the first valve, and

a lock mechanism that locks the equipment connector and the container connector in a state where the first valve is pressed by the second valve, the first valve and the second valve are opened and the first liquid flow path
25 is in communication with the second liquid flow path, and that unlocks the connectors in a state where the first valve and the second valve are closed, wherein the

equipment connector comprises a pressure adjustment section, and a first gas flow path connected to the pressure adjustment section,

5 the first valve is to open and close the first liquid flow path and the first gas flow path,

the container connector comprises a second gas flow path that communicates with the interior of the container when the container is connected to the second connecting section,

10 the second valve is to open and close the second liquid flow path and the second gas flow path, and

the lock mechanism locks the equipment connector and the container connector in a state where the first valve is pressed by the second valve, the first valve and the second valve are opened, the first liquid flow path is in communication with the second liquid flow path, and the first gas flow path is in communication with the second gas flow path, and the lock mechanism unlocks the connectors in a state where the first valve and the second valve are closed, wherein the equipment connector further comprises a fixed body in which the first connecting section is formed,

a first needle fixed to the fixed body, formed with the first liquid flow path therein, and having an opening on a tip side,

25 a second needle fixed to the fixed body, formed with the first gas flow path therein, and having an opening on a tip side,

a first seal, and

a moving body supported by the fixed body so that the first seal is movable in a axial direction of the first needle and the second needle between a position to liquid-tightly seal the opening of the first needle and air-tightly seal the opening of the second needle and a position through which the first needle and the second needle extend,

the first seal, the first needle and the second needle constitute the first valve,

the container connector comprises a first member having the second liquid flow path and the second gas flow path therein,

a second seal provided at an end portion of the first member to seal the second liquid flow path and the second gas flow path, and

a tubular second member that stores the first member and the second seal therein, and

the lock mechanism comprises a first engaging section formed in the moving body, and

a first engaged section formed in the second member, and engaged with the first engaging section in a state where the first seal is pressed by the second seal, to move the moving body so that the first needle extends through the first seal and the second seal and the first needle is disposed in the second liquid flow path, and the second needle extends through the first seal and the second seal

and the second needle is disposed in the second gas flow path, to fix the equipment connector and the container connector.

[Claim 7]

5 The connection equipment according to claim 6, wherein the fixed body comprises an abutment section for the fixed body which abuts on the first engaging section in a state where the opening of the first needle and the opening of the second needle are arranged in the first seal, to move
10 the first engaging section to a position where the first engaging section disengages from the first engaged section.

[Claim 8]

 The connection equipment according to claim 6, comprising:

15 a second engaging section formed in the moving body,
 a second engaged section formed in the fixed body, and engaged with the second engaging section in a state where the opening of the first needle and the opening of the second needle are present in the first seal, to regulate
20 the movement of the moving body, and

 an abutment section for the moving body which is formed in the second member, and abuts on the second engaging section to move the second engaging section to a position where the second engaging section disengages from
25 the second engaged section.

[Claim 9]

 The connection equipment according to claim 8, wherein

the moving body comprises a tubular head sleeve, and
a stopper sleeve fixed to the head sleeve, and
comprising a first arm as the second engaging section
extending in an axial direction of the fixed body, a second
5 arm as the first engaging section extending in the axial
direction of the fixed body, and a coupling section that
couples the first arm and the second arm, the first arm,
the second arm and the coupling section being annularly
arranged, and the first arm and the second arm being
10 tiltable toward an axis of the head sleeve,

the fixed body is formed in a tubular shape that
stores the head sleeve and the stopper sleeve therein, and
comprises, in an inner peripheral surface, a locking
protrusion as the second engaged section that is abutable
15 on the first arm in the axial direction of the fixed body,
and an unlocking protrusion that abuts on the second arm,
to tilt the second arm to a position where the second arm
disengages from the first engaged section, and

the second member comprises the abutment section for
20 the moving body in an outer peripheral surface, and in the
outer peripheral surface, a locking recess as the first
engaged section in which the second arm is engageable is
formed.

[Claim 10]

25 The connection equipment according to claim 1 or claim
6, wherein the pressure adjustment section comprises an air
bag and an air bag storage section that stores the air bag.

[Claim 11]

An equipment connector comprising:

a first connecting section that is connectable to equipment through which a fluid moves,

5 a first liquid flow path that communicates with an interior of the equipment when the equipment is connected to the first connecting section,

a first valve that is to open and close the first liquid flow path and that opens when pressed,

10 a lock mechanism that locks a container connector in a state where the first valve is pressed by a second valve of the container connector, the first valve and the second valve are opened and the first liquid flow path is in communication with a second liquid flow path of the container connector, and that unlocks the container
15 connector in a state where the first valve and the second valve are closed,

a pressure adjustment section, and

a first gas flow path connected to the pressure
20 adjustment section, wherein the first valve is to open and close the first liquid flow path and the first gas flow path, and

the lock mechanism locks the container connector in a state where the first valve is pressed by the second valve
25 of the container connector, the first valve and the second valve are opened, the first liquid flow path is in communication with the second liquid flow path of the

container connector, and the first gas flow path is in communication with a second gas flow path of the container connector, and the lock mechanism unlocks the container connector in the state where the first valve and the second valve are closed,

wherein the equipment connector further comprises a fixed body in which the first connecting section is formed, a first needle fixed to the fixed body, formed with the first liquid flow path therein, and having an opening on a tip side,

a second needle fixed to the fixed body, formed with the first gas flow path therein, and having an opening on a tip side,

a first seal, and a moving body supported by the fixed body so that the first seal is movable in a axial direction of the first needle and the second needle between a position to liquid-tightly seal the opening of the first needle and air-tightly seal the opening of the second needle and a position through which the first needle and the second needle extend,

the first seal, the first needle and the second needle constitute the first valve,

the container connector comprises a first member having the second liquid flow path and the second gas flow path therein,

a second seal provided at an end portion of the first

member to seal the second liquid flow path and the second gas flow path, and

a tubular second member that stores the first member and the second seal therein, and

5 the lock mechanism comprises a first engaging section formed in the moving body, and

a first engaged section formed in the second member, and engaged with the first engaging section in a state where the first seal is pressed by the second seal, to move
10 the moving body so that the first needle extends through the first seal and the second seal and the first needle is disposed in the second liquid flow path, and the second needle extends through the first seal and the second seal and the second needle is disposed in the second gas flow
15 path, to fix the equipment connector and the container connector.