

Patent Documents

- [0005] [Patent Document 1] JP 2013-135729A
- [Patent Document 2] WO 2010/122988
- [Patent Document 3] JP 2008-029607A
- [Patent Document 4] JP H11-197254A
- [Patent Document 5] JP 2010-075684A
- [Patent Document 6] JP 2013-252165A

Disclosure of Invention

Problem to be Solved by the Invention

[0006] However, the production of the connector disclosed in Patent Document 2 is complicated because the first member unit and the second member unit, which are made of different materials, need to be integrated with each other using a two-color injection molding method.

[0007] Furthermore, the connectors disclosed in Patent Documents 1 and 2 have an issue in which, for example, when a tube that has a different diameter is to be connected, a connector suited to that tube needs to be newly designed and produced. Also, when the connector is to be provided integrally with an additional member (e.g., a bypass injection port) other than the tube to thereby form a single unit, an entire unit including the connector and the additional member needs to be newly designed and produced. Thus, multiple types of connectors that are largely similar with one another but are only partially different from one another are needed, and this makes management of connectors more complicated and increases the cost of connectors. Therefore, there is demand for a highly versatile connector with a configuration that enables replacement of only a portion that has been subjected to a design change.

[0008] Embodiments of the present invention provide a connector that can be easily produced and is highly versatile.

Means for Solving Problem

[0009] According to an aspect of the present invention, there is provided a connector that includes a first member and a second member. The first member and the second member are coupled to each other in a coupling portion. The first member includes, on

a side opposite to the coupling portion, a main portion that can be connected to and disconnected from a counterpart connector other than the connector. A flow channel via which the main portion and the second member are in communication with each other extends along a central axis of the connector. One of the first member and the second member includes an outer cylindrical portion that has a hollow cylindrical shape and is coaxial with the central axis. The other of the first member and the second member includes an inner cylindrical portion that has a hollow cylindrical shape and is coaxial with the central axis. In the coupling portion, the inner cylindrical portion is fitted in the outer cylindrical portion. The outer cylindrical portion includes a first engagement portion and an abutment portion. The inner cylindrical portion includes a second engagement portion that engages the first engagement portion, and a leading end that is a front end of the inner cylindrical portion in a direction in which the inner cylindrical portion is fitted into the outer cylindrical portion. As a result of the first engagement portion and the second engagement portion engaging each other, the leading end of the inner cylindrical portion abuts against the abutment portion of the outer cylindrical portion along the central axis, wherein the first member is unrotatable relative to the second member.

Effects of the Invention

[0010] The connector according to embodiments of the present invention is obtained by producing the first member and the second member separately and then coupling the first member and the second member together to form a single unit. Therefore, the connector can be easily produced.

[0011] It is possible to obtain multiple types of connectors by replacing the first member or the second member. Therefore, the connector according to embodiments of the present invention is highly versatile.

[0012] Since the leading end of the inner cylindrical portion abuts against the abutment portion of the outer cylindrical portion along the central axis, an inner circumferential surface of the flow channel is continuous without a gap between the leading end of the inner cylindrical portion and the abutment portion of the outer cylindrical portion.

Brief Description of Drawings

CLAIMS

1. A connector comprising a first member and a second member, the first member and the second member being coupled to each other in a coupling portion,

wherein the first member includes, on a side opposite to the coupling portion, a main portion that can be connected to and disconnected from a counterpart connector other than the connector,

a flow channel via which the main portion and the second member are in communication with each other extends along a central axis of the connector,

one of the first member and the second member includes an outer cylindrical portion that has a hollow cylindrical shape and is coaxial with the central axis,

the other of the first member and the second member includes an inner cylindrical portion that has a hollow cylindrical shape and is coaxial with the central axis,

in the coupling portion, the inner cylindrical portion is fitted in the outer cylindrical portion,

the outer cylindrical portion includes a first engagement portion and an abutment portion,

the inner cylindrical portion includes a second engagement portion that engages the first engagement portion, and a leading end that is a front end of the inner cylindrical portion in a direction in which the inner cylindrical portion is fitted into the outer cylindrical portion, and

as a result of the first engagement portion and the second engagement portion engaging each other, the leading end of the inner cylindrical portion abuts against the abutment portion of the outer cylindrical portion along the central axis,

wherein the first member is unrotatable relative to the second member.

2. The connector according to claim 1, wherein at least one of the first engagement portion and the second engagement portion has an inclined surface that is inclined relative to the central axis, and

the inclined surface is inclined such that the leading end of the inner cylindrical portion abuts against the abutment portion of the outer cylindrical portion along the central axis.

3. The connector according to claim 1 or 2, wherein the leading end of the inner cylindrical portion annularly abuts against the abutment portion so as to surround the flow channel.
4. The connector according to any one of claims 1 to 3, wherein an inner circumferential surface of the outer cylindrical portion has a first fitting surface, and an outer circumferential surface of the inner cylindrical portion has a second fitting surface that is fitted to the first fitting surface.
5. The connector according to claim 4, wherein, as a result of the first fitting surface and the second fitting surface being fitted to each other, the outer cylindrical portion and the inner cylindrical portion are coaxially positioned.
6. The connector according to claim 4 or 5, wherein a liquid-tight seal is formed between the first fitting surface and the second fitting surface.
7. The connector according to any one of claims 4 to 6, wherein a lubricant is added between the first fitting surface and the second fitting surface.
8. The connector according to any one of claims 1 to 7, wherein an inner circumferential surface of the flow channel is continuous without a level difference and a gap between the first member and the second member.
9. The connector according to any one of claims 1 to 8, wherein the main portion includes a male member or a female member.
10. The connector according to any one of claims 1 to 9, wherein the second member is connectable to an end of a flexible tube.
11. The connector according to any one of claims 1 to 9, wherein the second member is provided on a bypass injection port.

12. The connector according to any one of claims 1 to 11, wherein the first member and the second member are made of different materials.