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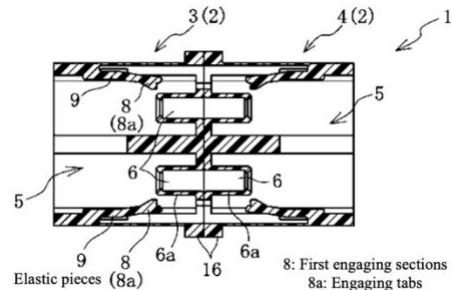
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(54) [Title of the Invention] Optical Connector

(57) [Abstract]

[Problem] In optical connectors allowing insertion of two-core plugs, the plug insertion holes have a single design, size, and shape, allowing only one type of plug to be inserted, which results in problems such as low universality of the optical connector and a greater number of optical parts when connecting different types of plugs.

[Solution] An adapter-type connector body 2 of an optical connector 1 is configured such that one pair of half-bodies 3, 4 are joined symmetrically; plug insertion holes are formed allowing selective insertion of different types of two-core plugs - an MU plug and an LC plug - into the half-bodies 3, 4; pairs of ferrule insertion sections 6 are formed inside the half-bodies 3, 4; the center-to-center pitch of the ferrule insertion sections 6 is formed to be equal to the optical fiber pitch in existing LC plugs; and the MU plug is formed having a narrow horizontal width, with the optical fiber pitch thereof being formed equal to the optical fiber pitch of the LC plug.



[Claims]

[Claim 1]

An optical connector provided with an adapter-type or receptacle-type connector body for insertion of two-core plugs retaining ends of two optical fibers, the connector body comprising specific plug insertion holes configured so as to allow selective insertion of first and second two-core plugs which are of mutually differing types and are used for the same type of optical fiber; a pair of ferrule insertion sections which are common to both plugs and into which are inserted a pair of ferrule tips of the first plug or the second plug, which have been inserted into the specific plug insertion holes; and a plurality of first engaging sections which engage the first plug inserted into one of the specific plug insertion holes, and a plurality of second engaging sections which engage the second plug inserted into one of the specific plug insertion holes.

[Claim 2]

The optical connector as claimed in claim 1, wherein the connector body is an adapter-type connector body in which the specific plug insertion holes are formed as a pair opposing each other.

[Claim 3]

The optical connector as claimed in claim 1, wherein the connector body is a receptacle-type connector body having one of the specific plug insertion holes.

[Claim 4]

The optical connector as claimed in any one of claims 1 to 3, wherein the second plug is a two-core LC plug, and the first plug is an MU plug which has an optical fiber pitch which is the same as the optical fiber pitch of the second plug.

[Claim 5]

The optical connector as claimed in claim 4, wherein a pair of engagement recesses which engage the pair of first engaging sections are formed on the left and right sides of the MU plug, and the first engaging sections comprise engaging tabs which releasably engage the engagement recesses.

[Claim 6]

The optical connector as claimed in claim 4, wherein two pairs of engagement protrusions which engage the two pairs of second engaging sections are formed on a pair of lever sections of the LC plug, and the second engaging sections comprise engaging steps formed on a top wall section of the LC plug, being engaging steps engaged by the engaging protrusions.

[Detailed Description of the Invention]

[0001]

[Technical Field of the Invention] The present invention relates to optical connectors, specifically to optical connectors allowing selective connection of two different types of plugs.

[0002]

[Prior Art] Conventionally, optical connectors used as optical communication circuit parts have included adapter-type optical connectors connecting pairs of plugs and receptacle-type optical connectors connecting one plug to an optical device. In adapter-type optical connectors, a pair of plugs are inserted into a pair of plug insertion holes and end faces thereof are abutted against each other, thereby optically connecting the optical fibers. In receptacle-type optical connectors, a plug is inserted into one plug insertion hole and the end face of the ferrule is abutted against the end face of the optical device-side ferrule, thereby optically connecting the optical fibers.

[0003]

Besides single-core optical connectors which connect only one optical fiber, two-core optical connectors which connect two optical fibers are also widely used, being commonly used in two-way optical communication and so forth. Patent Literature 1 and 2 describe common two-core receptacle-type optical connectors.

Like single-core optical connectors, two-core optical connectors include various types, such as MU, LC, SC, and so on, used for the same type of optical fiber. Because the design, size, shape, optical fiber pitch, and so on of the plugs which retain the ends of the two optical fibers are different in different types of two-core optical connectors, dedicated plugs and connector bodies are used for each.

[0004]

For example, in an MU optical connector, the optical fiber pitch is 4.5 mm or 7.5 mm, but the optical fiber pitch in LC optical connectors is 6.25 mm, meaning an MU plug cannot be inserted into the plug insertion hole of an LC optical connector, and an LC plug cannot be inserted into the plug insertion hole of an MU optical connector.

Accordingly, in order to optically connect an MU plug and an LC plug together, for example, it has been necessary to use an MU optical connector, a jumper provided with an MU plug and an LC plug on either end, and an LC optical connector, connect the MU plug into the MU optical connector, connect the MU plug on one end of the jumper to the MU optical connector, connect the LC plug on the other end of the jumper to the LC optical connector, and then connect the LC plug into the LC optical connector.

[0005]

[Patent Literature 1] JP H5-215943 A (FIGs. 1 to 4)

[Patent Literature 2] JP 2000-315921 A (FIGs. 1 and 2)

[0006]

[Problem to Be Solved by the Invention] As noted above, in conventional optical connectors, each type of optical connector has had a single design, size, and shape for the plug insertion hole in the connector body and a single design, size, and shape for the plug, meaning only one type of plug could be inserted into the plug insertion hole, which limits the universality of the optical connector. Therefore, connecting different types of plugs has required a large number of optical parts (optical connectors, plugs, jumpers, and so on), which is cost-ineffective in terms of equipment, requires a great deal of labor in making the connections, and results in proportionally greater optical connection loss relative to the increase in the number of optical connections, among other problems.

[0007]

The object of the present invention is to provide an adapter-type or receptacle-type optical connector with greater universality and cost-effectiveness by selectively allowing insertion of two types of plugs into plug insertion holes in a connector body.

[0008]

[Means for Solving the Problem]

An optical connector provided with an adapter-type or receptacle-type connector body for insertion of two-core plugs retaining ends of two optical fibers, the connector body comprising specific plug insertion holes configured so as to allow selective insertion of first and second two-core plugs which are of mutually differing types and are used for the same type of optical fiber; a pair of ferrule insertion sections which are common to both plugs and into which are inserted a pair of ferrule tips of the first plug or the second plug, which have been inserted into the specific plug insertion holes; and a plurality of first engaging sections which engage the first plug inserted into one of the specific plug insertion holes, and a plurality of second engaging sections which engage the second plug inserted into one of the specific plug insertion holes.

[0009]

In this optical connector, in inserting the first plug into the connector body, when the first plug is inserted into the specific plug insertion hole in the connector body, the plurality of first engaging sections in the connector body engage the first plug and the tips of the pair of ferrules in the first plug are inserted into the pair of ferrule insertion sections. In inserting the second plug into the connector body, when the second plug is inserted into the specific plug insertion hole in the connector body, the second plug engages the plurality of second engaging sections in the connector body, and the tips of the pair of ferrules in the second plug are inserted into the pair of ferrule insertion sections.

[0010]

Note that if the connector body is an adapter-type connector body, a two-core plug can be connected to a two-core plug, and if the connector body is a receptacle-type connector body, one two-core plug can be connected to an optical device.

[0011]

The optical connector as claimed in claim 2 is such that in the invention of claim 1, the connector body is an adapter-type connector body in which the specific plug insertion holes are formed as a pair opposing each other. Therefore, three types of connection are possible: between the first plugs, between the first plug and the second plug, and between the second plugs.

[0012]

The optical connector as claimed in claim 3 is such that in the invention of claim 1, the connector body is a receptacle-type connector body having one of the specific plug insertion holes. In this case, the first plug or the second plug can be inserted into the specific plug insertion hole.

[0013]

The optical connector as claimed in 4 is such that in the invention of any one of claims 1 to 3, the second plug is a two-core LC plug, and the first plug is an MU plug which has an optical fiber pitch which is the same as the optical fiber pitch of the second plug. The optical fiber pitch of the first plug and the optical fiber pitch of the second plug are formed to be equal, so the tips of the pair of ferrules of the first and second plugs can be inserted into the pair of common ferrule insertion sections.

[0014]

The optical connector as claimed in claim 5 is such that in the invention of claim 4, a pair of engagement recesses which engage the pair of first engaging sections are formed on the left and right sides of the MU plug, and the first engaging sections comprise engaging tabs which releasably engage the engagement recesses. Since the pair of engagement recesses are formed on the left and right sides of the MU plug, there is no need to form an engagement recess in the middle in the left-right width of the MU plug, making it possible to make the left-right width of the MU plug smaller. Moreover, when removing the MU plug from the plug insertion hole, pulling the MU plug in the removal direction causes the engaging tabs to elastically deform and separate from the engagement recesses.

[0015]

The optical connector as claimed in claim 6 is such that in the invention of claim 4, two pairs of engagement protrusions which engage the two pairs of second engaging sections are formed on a pair of lever sections of the LC plug, and the second engaging sections comprise engaging steps formed on a top wall section of the LC plug which are engaged by the engaging protrusions.

When inserting the LC plug into the plug insertion hole, the engaging protrusions engage the engaging steps through elastic deformation of the lever sections. Moreover, when removing the LC plug from the plug insertion hole, the lever sections can be operated to separate the engaging protrusions from the engaging steps and remove the LC plug.

[0016]

[Embodiments] Embodiments of the present invention are described below with reference to the drawings. The present embodiment is one example of a case in which the present invention is applied to an adapter-type optical connector. Note that the top and front directions of FIG. 1 are described as the top and front directions. As shown in FIGs. 1 to 4, an optical connector 1 is provided with an adapter-type connector body 2 for insertion of two-core plugs which retain the ends of two optical fibers. The connector body 2 of the optical connector 1 has a structure in which a pair of symmetrical half-bodies 3, 4, which are made out of synthetic resin and in which plug insertion holes 5 are formed, are joined together.

[0017]

These half-bodies 3, 4 are joined back to back in the forward and back direction to form the connector body 2, the pair of plug insertion holes 5 are positioned symmetrically in a single line in the forward and back direction, and each of the plug insertion holes 5 is configured as a specific plug insertion hole allowing selective insertion of both a two-core MU plug 20 and a two-core LC plug 40 which are of different types from each other and are used for the same type of optical fiber (henceforth simply "plug insertion holes"). Note that the MU plug 20 corresponds to the first plug and the LC plug 40 corresponds to the second plug.

[0018]

The connector body 2 and the half-bodies 3, 4 will now be described in detail. Note that the half-body 4 has the same structure as the half-body 3, so the same reference numerals are given and a description thereof is omitted. As shown in FIGs. 1 to 4, formed in the half-body 3 are: the plug insertion hole 5; a pair of common ferrule insertion sections 6 which guide tips of ferrules 21 of the MU plug 20 or of ferrules 41 of the LC plug 40 inserted into the plug insertion hole 5 towards the partner plug insertion hole 5; a pair of first engaging sections 8 which engage a pair of engagement recesses 22 on the left and right sides of the MU plug 20 inserted into the plug insertion hole 5; two pairs of second engaging sections 10 (see FIG. 12) which engage two pairs of engaging projections 44 on lever sections 42 on the top surface of the LC plug 40 inserted into the plug insertion hole 5; and so on.

[0019]

The plug insertion hole 5 is a plug insertion hole which can be used in common for both the two-core MU plug 20 and the two-core LC plug 40, and is formed with a bottom wall 12, left and right side walls 13, a top wall 14, and so on. A dividing wall 15 is formed on the rear end side of the plug insertion hole 5 (on side towards the half-body 4), and a pair of cylindrical sections 6a which form the pair of plug insertion sections 6 are formed

protruding forward in the dividing wall 15. The pair of cylindrical sections 6a protrude coaxially in the forward and back direction from the half-bodies 3, 4, so tip end faces of the pair of ferrules 21, 44 inserted into the fiber insertion sections 6 in the forward and back direction abut each other, forming an optical connection between the tip end faces of two optical fibers. Note that the center-to-center distance between the pair of cylindrical sections 6a is set so as to be the same as the optical fiber pitch of the LC plug 40 (6.25 mm).

[0020]

The dividing walls 15 of the half-bodies 3, 4 are fused or adhered to each other to achieve surface contact, and in this state the pair of ferrule insertion sections 6, 6 of the half-bodies 3, 4 are continuous and concentric (see FIGs. 3 and 10). Note that it is also possible to additionally use a structure in which a plurality of protrusions are fitted into a plurality of holes to secure the dividing walls 15 of the half-bodies 3, 4 to each other. Also note that flanges 16 are formed on the half-bodies 3, 4 in order to join the dividing walls 15 and to position and secure the connector body 2 to an external mounting connector attachment panel or the like.

[0021]

Next, the MU plug 20 and the LC plug 40 are described.

As shown in FIG. 5 to 6 and FIG. 10, the MU plug 20 has a case member 23 with a structure in which two rectangular cylindrical case sections 24 are arranged and linked together; two retaining members 25 which are fitted into the case member 23; the two ferrules 21 which are accommodated in and retained by the two retaining members 25; coil springs (not shown in the drawings) which elastically bias the ferrules 21; and so on. Openings are formed on the left and right sides of the case member 23, and the engagement recesses 22 are formed in parts of the retaining members 25 which are exposed to the outside through these openings.

Abutting sections 24a which abut the front end of the half-body 3 when the plug 20 is inserted into the connector body 2 are formed on the left and right sides of the MU plug 20 (see FIG. 10).

[0022]

Two optical fiber cables 26 are guided into the pair of rectangular cylindrical case sections 24 via boots 27, the optical fibers with the optical fiber tip coverings removed are guided into the ferrules 21, the tips of the optical fibers are inserted into and retained in holes for the tips of the ferrules 21, the tips of the optical fibers are exposed to the tips of the ferrules 21, and the tip end faces of the ferrules 21 and the tip end faces of the optical fibers form a single surface. The center-to-center pitch of the ferrules 21 in the MU plug 20, i.e., the optical fiber pitch of the pair of optical fibers, is set so as to be the same as the optical fiber pitch of the LC plug 40 (6.25 mm). In order to achieve this, instead of forming the engagement recesses 22 on the left and right sides of the rectangular cylindrical case sections 24 as in the prior art, the engagement recesses 22 are omitted from the mutually opposing side sections of the pair of rectangular cylindrical case sections 24 (the side sections of the central section in the left-right width direction of the MU plug 20), the distance between the pair of rectangular cylindrical case sections 24 is made smaller than in the prior art, and the optical fiber pitch is set to 6.25 mm.

[0023]

As shown in FIG. 7 to 9, 11, and 12, the LC plug 40 has a case member 45 having a structure in which a pair of rectangular cylindrical case sections 46 are arranged and linked; a pair of ferrules 41 which are accommodated in and retained by the two rectangular cylindrical case sections 46; coil springs (not shown in the drawings) which elastically bias the ferrules 41; and so on. Formed on the top surfaces of the rectangular cylindrical case sections 46 are the lever sections 42 which extend diagonally upward from the tip to the base side and operational lever sections 43 which extend diagonally upward from the base towards the tip of the rectangular cylindrical case sections 46, the two operational lever sections 43 being formed continuously and as a single unit in the left-right direction. The lever sections 42 and the operational lever sections 43 have elasticity in the vertical direction, and a pair of engaging protrusions 44 which protrude in the left and right directions are formed on the lever sections 42.

[0024]

In the LC plug 40, as in the case of the MU plug 20, two optical fiber cables 47 are introduced into the pair of rectangular cylindrical case sections 46 via boots 48, the optical fibers with the optical fiber tip coverings removed are introduced into the ferrules 41, tips of the optical fibers are inserted into and retained by holes for the tips of the ferrules 41, the tips of the optical fibers are exposed to the tips of the ferrules 41, and the tip end faces of the ferrules 41 and the tip end faces of the optical fibers form a single surface. The optical fiber pitch in the LC plug 40 is set to 6.25 mm, the same as in the prior art.

[0025]

As shown in FIGs. 3 and 10, a pair of first engaging sections 8 which engage the MU plug 20 inserted into the plug insertion hole 5 are formed on left and right side wall sections 13 of the half-body 3. This pair of first engaging sections 8 comprise a left and right pair of engaging tabs 8a which releasably engage, from the left and right sides, the left and right pair of engagement recessions 22 on the MU plug 20 inserted into the plug insertion hole 5 of the half-body 3.

These engaging tabs 8a are formed on rear end sections of elastic pieces 8 facing in the forward and back direction provided along the side walls 13, and the front end sections of the elastic pieces 9 are formed as a single unit with the side walls 13. With the plug 20 or 40 inserted into the plug insertion hole 5, the engaging tabs 8a protrude further towards the axial center than the elastic pieces 8.

[0026]

When the MU plug 20 is inserted into the plug insertion hole 5, the engaging tabs 8a abut the side surfaces of the MU plug 20, and the side walls push the engaging tabs 8a away from the axial center via elastic deformation of the elastic pieces 9. Once the MU plug 20 has been completely inserted into the plug insertion hole 5, the tips of the pair of ferrules 21 of the MU plug 20 are inserted into the pair of ferrule insertion sections 6, facing the partner plug insertion section 6 in a slightly protruding manner, and are able to abut the tips of the partner pair of ferrules 21 or 41. The MU plug 20 is retained once the pair of engaging tabs 8a engage the pair of engagement recessions 22 on the MU plug 20.

[0027]

As shown in FIGs. 1 and 12, two pairs of (i.e., four) second engaging sections 10 which engage the LC plug 40 inserted into the plug insertion hole 5 are formed in the top wall section of the half-body 3 of the connector body 2 via four rectangular holes 11.

These two pairs of second engaging sections 10 comprise two pairs of engaging steps 10a which releasably engage two pairs of engaging protrusions 44 on the lever sections 42 of the LC plug 40 inserted into the plug insertion hole 5. One pair of left and right lever guiding grooves 17 for guiding the pair of lever sections 42 of the LC plug 40 and two pairs of slider grooves 17a which can guide the two pairs of engaging protrusions 44 are formed in the top section of the plug insertion hole 5, and the pair of engaging steps 10a are formed on the rear end section of the slider grooves 17a.

[0028]

As the LC plug 40 is inserted into the plug insertion hole 5, the pair of lever sections 42 elastically deform downward and are guided into the pair of lever guiding grooves 17, the two pairs of engaging protrusions 44 are guided into the two pairs of slider grooves 17a, and once the LC plug 40 is completely inserted into the plug insertion hole 5, the tips of the pair of ferrules 41 of the LC plug 40 are inserted into the pair of ferrule insertion sections 6 and protrude slightly towards the partner plug insertion section 6. In this state, the lever sections 42 return, causing the four engaging protrusions 44 to engage the four engaging steps 10a and causing the LC plug 40 to remain inserted.

[0029]

If the operational lever sections 43 are pushed down with the LC plug 40 inserted into the plug insertion hole 5, the pair of lever sections 42 are pushed down, the four engaging protrusions 44 are disengaged from the four engaging steps 10a, and the LC plug 40 can be pulled out. Note that when the LC plug 40 is inserted into the plug insertion hole 5, the pair of engaging tabs 8a abut the left and right side surfaces of the LC plug 4 and the engaging pieces 9 maintain an elastically deformed state.

[0030]

With the MU plug 20 or the LC plug 40 inserted into only one of the pair of plug insertion holes 5, the tips of the ferrules 21 or 41 protrude slightly from the ferrule insertion section 6 towards the partner plug insertion section 6. In the plugs 20, 40, the ferrules 21, 41 are able to move by a small stroke towards the axial center of the connector body 2, being biased towards the forward end section by the coil spring. Therefore, when the plugs 20, 40 are inserted into both of the pair of plug insertion holes 5, the tip end faces of one of the pairs of ferrules 21 or 41 abut the tip end faces of the other pair of ferrules 21 or 41, optically connecting the two optical fibers. A pair of optical fibers can thus be connected making this optical connector 1 suitable for connection of optical fibers for two-way communication.

[0031]

The operation and effects of the foregoing optical connector 1 are described next.

With this optical connector 1, the pair of plug insertion holes 5 are provided in a straight line, and both of these plug insertion holes 5 are configured as the specific plug insertion holes allowing selective insertion of both the two-core MU plug 20 and the two-core LC plug 40 which are different from each other and are used for the same type of optical fiber.

[0032]

When the MU plug 20 is inserted into the plug insertion hole 5 of the connector body 2, the pair of first engaging sections 8 engage the pair of engagement recesses 22 in the MU plug 20, and the MU plug 20 is thereby retained. When the LC plug 40 is inserted into the plug insertion hole 5 of the optical connector 2, the four second engaging sections 10 engage the four engaging protrusions 44 on the LC plug 40, and the LC plug 40 is secured.

[0033]

With this optical connector 1, the two plug insertion holes 5 formed in the connector body 2 are common plug insertion holes for both the MU plug 20 and the LC plug 40, and the pair of ferrule insertion sections 6 provided to each of the plug insertion holes 5 can guide the tips of the pair of ferrules 21 of the MU plug 20 and can guide the tips of the pair of ferrules 41 of the LC plug 40.

[0034] Therefore, this optical connector 1 allows three types of connections: MU plug 20 – MU plug 40 [SIC], LC plug 40 – LC plug 40, and MU plug 20 — LC plug 40, and if directionality of the connection is taken into consideration, then four types of connections are possible, including also LC plug 40 — MU plug 20, achieving outstanding universality. In particular, when connecting the MU plug 20 and the LC plug 40, the connection can be made in a simple manner using this optical connector 1, without requiring jumpers or extra optical connectors, which makes it possible to significantly simplify the optical fiber connection structure, which is advantageous in terms of cost-effectiveness and also reduces optical connection loss since there are fewer optical connection sites.

[0035]

The pair of first engaging sections 8 comprise the pair of engaging tabs 8a which releasably engage, from the left and right sides, the MU plug 20 inserted into the plug insertion hole 5, which makes it possible to securely retain the MU plug 20, since these engaging tabs 8a are caused to securely engage the MU plug 20 from both sides. The four second engaging sections 10 comprise the four engaging steps 10a which releasably engage the four engaging protrusions 44 on the two lever sections 42 of the LC plug 40 inserted into the plug insertion hole 5, and therefore the LC plug 40 can be securely retained as these engaging steps 10a are caused to securely engage the engaging protrusions 44 on the LC plug 40.

[0036]

Next, variations are described in which the foregoing embodiment is partially modified.

1) With the foregoing optical connector 1, an example was described in which a pair of the specific plug insertion holes 5 having the same structure were formed in the connector body 2, but a configuration is also possible in which only one of the plug insertion holes 5 is configured to be the specific plug insertion hole allowing selective insertion of both the MU plug 20 and the LC plug 40 and the other plug insertion hole 5 is configured so as to allow insertion only of the MU plug 20. In this case, only two types of connections are possible: MU plug 20 – MU plug 20, and MU plug 20 – LC plug 40. Note, moreover, that a configuration is also possible in which said other plug insertion hole 5 only allows insertion of the LC plug 40 instead of the MU plug 20.

[0037]

2) With the foregoing optical connector 1, a case was described as an example in which the first plug is the MU plug 20 and the second plug is the LC plug 40, but it is also possible to configure a connector in which the first plug is the LC plug 40 or the MU plug 20 and the second plug is an SC plug.

[0038]

3) In the foregoing embodiment, an example was described of the optical connector 1 provided with the adapter-type connector body 2, but the optical connector according to the present invention can similarly be applied to optical connectors provided with receptacle-type connector bodies.

For example, an optical connector 1A shown in FIG. 13 is an optical connector provided with a receptacle-type connector body 2A, and the connector body 2A of the optical connector 1A is provided as an accessory to an optical device OD having light receiving and emitting functions. Note that the structure of the connector body 2A is basically the same as the structure of the half-body 3, so a description thereof is omitted. The drawing shows the MU plug 20 inserted into the one plug insertion hole in the connector body 2A, and, like with the

optical connector 1, both the MU plug 20 and the LC plug 40 can be selectively inserted into the plug insertion hole of the connector body 2A.

[0039]

4) Besides this, the embodiment shown in FIGs. 1 to 12 only show one example, but various modifications can be applied without departing from the gist of the invention. Moreover, the variation in FIG. 13 only shows one example, but various modifications can be applied without departing from the gist of the invention.

[0040]

[Effects of the Invention] With the optical connector in claim 1, an adapter-type or receptacle-type connector body is provided with specific plug insertion holes, a pair of ferrule insertion sections, a plurality of first engaging sections, and a plurality of second engaging sections, and therefore different types of two-core first and second plugs which are used with the same type of optical fiber can be selectively inserted into the connector body, thereby obtaining an optical connector with outstanding universality and cost-effectiveness. As a result, the number of optical parts needed when connecting different types of plugs (optical connectors, plugs, jumpers, and so forth) can be reduced, the amount of labor involved in the connections can be reduced, the cost effectiveness of the equipment can be increased, and optical connection loss can be reduced.

[0041]

With the optical connector in claim 2, the connector body is an adapter-type connector body in which a pair of the specific plug insertion holes are formed opposing each other, making it possible to selectively insert the two-core first plug and second plug into both of the specific plug insertion holes. Three types of connections are therefore possible: a connection between the first plugs, a connection between the first plug and the second plug, and a connection between the second plugs, thereby obtaining an optical connector with even greater universality.

[0042]

With the optical connector in claim 3, the connector body is a receptacle-type connector body having one specific plug insertion hole, so the first plug or the second plug can be inserted into the specific plug insertion hole.

With the optical connector in claim 4, the optical fiber pitch of the first plug and the optical fiber pitch of the second plug are formed to be equal, making it possible to insert the tips of the pair of ferrules of the first and second plugs into the pair of common ferrule insertion sections.

[0043]

With the optical connector in claim 5, a pair of engagement recesses which engage the pair of first engaging sections are formed on the left and right sides of the MU plug, and the first engaging sections comprise engaging tabs which releasably engage the engagement recesses. Therefore, there is no need to form an engagement recess in the center of the left-right width of the MU plug, meaning the left-right width of the MU plug can be reduced, and the optical fiber pitch of the MU plug can be made to match the optical fiber pitch of the LC plug, thereby making it possible to achieve an optical connector allowing selective insertion of MU plugs and LC plugs.

[0044]

With the optical connector in claim 6, two pairs of engaging protrusions which engage two pairs of second engaging sections are formed on a pair of lever sections on the LC plug, and the second engaging sections comprise engaging steps which are engaged by the engaging protrusions and are formed on the top wall section of the LC plug. Therefore, to remove the LC plug from the connector body, the lever sections can be operated, releasing the engaging protrusions from the engaging steps, which makes it possible to remove the LC plug in a simple manner.

[Brief Description of the Drawings]

FIG. 1 is an oblique view of a connector body in an optical connector according to an embodiment of the present invention.

FIG. 2 is a frontal view of the connector body.

FIG. 3 is a transverse plan view of the connector body.

FIG. 4 is a longitudinal cross-sectional view of the connector body.

FIG. 5 is an oblique view of an MU plug.

FIG. 6 is a frontal view of an MU plug.

FIG. 7 is an oblique view of an LC plug.

FIG. 8 is a lateral view of an LC plug.

FIG. 9 is a frontal view of an LC plug.

FIG. 10 is a transverse plan view of the optical connector (with an MU plug inserted).

FIG. 11 is a longitudinal cross-sectional lateral view of the optical connector (with an LC plug inserted).

FIG. 12 is a longitudinal cross-sectional lateral view of the optical connector (with an LC plug inserted).

FIG. 13 is an oblique view of an optical connector according to a variation.

[Explanation of the Reference Numerals]

- 1, 1A optical connector
- 2, 2A connector body
- 3, 4 half-bodies
- 5 plug insertion hole
- 6 ferrule insertion section
- 8 first engaging sections
- 8a engaging tabs
- 9 elastic pieces
- 10 engaging steps
- 20 MU plug (first plug) 21 ferrules
- 22 engagement recesses
- 40 LC plug (second plug)
- 41 ferrules
- 42 lever sections
- 43 operational lever sections
- 44 engaging protrusions

FIG. 1

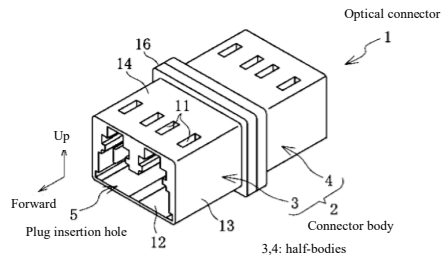


FIG. 2

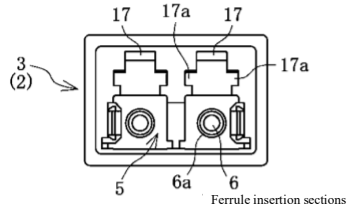


FIG. 3

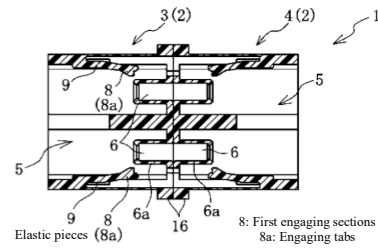


FIG. 4

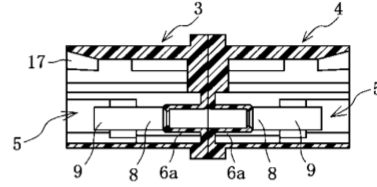


FIG. 5

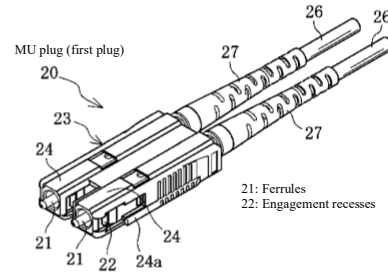


FIG. 6

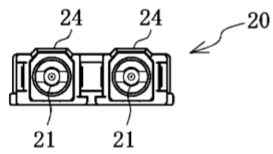


FIG. 9

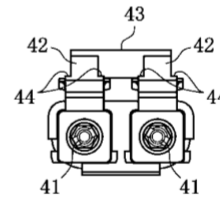


FIG. 7

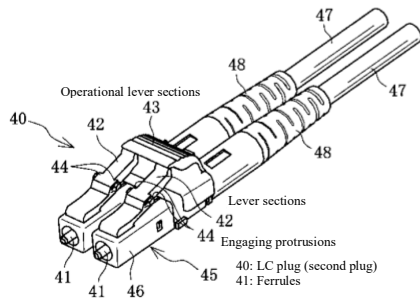


FIG. 8

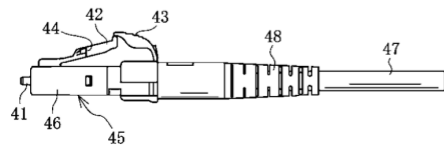


FIG. 10

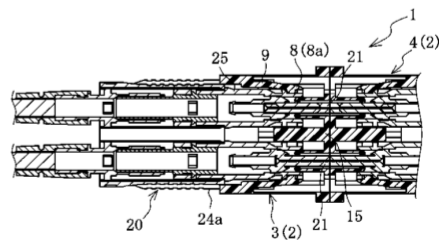


FIG. 11

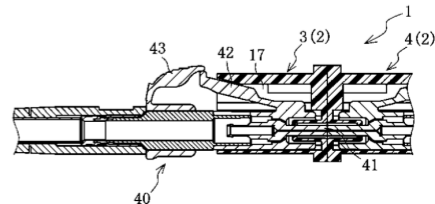


FIG. 12

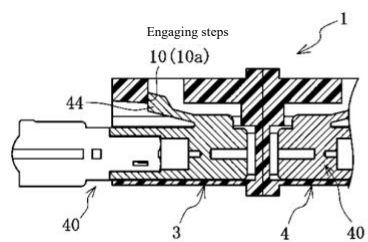
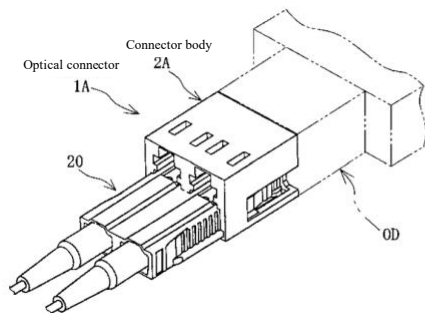


FIG. 13



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(54) 【発明の名称】 光コネクタ

(57) 【要約】

【課題】 2芯型のプラグを装着する型式の光コネクタにおいては、プラグ装着穴の構造・サイズ・形状が1通りに設定されていて、1種類のプラグしか装着することができなかったため、光コネクタの汎用性が低く、異種のプラグを接続するような場合の光学部品の数が多くなる等の問題がある。

【解決手段】 光コネクタ1のアダプタ型のコネクタ本体2は、1対の本体分割体3、4を対称に結合して構成され、各本体分割体3、4には型式の異なる2芯型のMU型プラグ、LC型プラグを択一的に装着可能なプラグ装着穴5が形成され、この本体分割体3、4の内部には、1対のフェルル挿入部6が形成され、これらフェルル挿入部6の軸心間ピッチは、既存のLC型プラグの光ファイバ間ピッチと等しく形成され、MU型プラグは左右幅を狭く形成してその光ファイバ間ピッチがLC型プラグの光ファイバ間ピッチと等しく形成されている。

【選択図】 図3

