

DESCRIPTION

MEDICAL ADMINISTERING SET

5 Technical Field

[0001] The present invention relates to a medical administering set including a medical container, a transfusion tube, and the like connected to each other, and in particular, to technology of connecting a nutrient container and a transfusion tube to each other reliably in a liquid-tight state while preventing mixing of impurities.

10 Background Art

[0002] As a method for transfusing a nutrient, a drug, or the like into a patient, transintestine nutrition therapy is known.

[0003] According to the transintestine nutrition therapy, a predetermined medical administering set including a medical container and a transfusion tube connected thereto is used. That is, a soft tube (called a "nasotracheal tube") is inserted so as to run from the nasal cavity to the bowel of a patient, and a liquid-like substance such as a nutrient, a drug, or a liquid diet (hereinafter referred simply as "nutrient") stored in the medical container is directly administered to the bowel of the patient through the nasotracheal tube.

20 [0004] Note that, besides the foregoing, there may be given a method for administering a nutrient into a patient through a percutaneous endoscopic gastrostomy (PEG) tube as the transintestine nutrition therapy.

[0005] A port (drainage port) is provided at a medical container, and a tip end of the port is usually sealed with a sealing cap before use. In order to perform the
25 above-mentioned transfusion, an operator removes the sealing cap of the medical container to open the port, thereby breaking sealing in the container. Then, a predetermined connection cap is connected to the port. On the other hand, a predetermined nozzle-like connector is prepared and connected to the connection cap, and one end of a nasotracheal tube or a PEG tube (or a transfusion tube to be
30 connected to the PEG tube) is connected to the connector. The connection cap and the connector are connected to each other. In this case, the port and the connector may be locked so as not to come off easily.

Prior Art Documents

Patent Documents

[0006] Patent document 1: JP 2009-125162 A

Patent document 2: JP 2009-153588 A

5 Patent document 3: JP 2002-283520 A

Disclosure of Invention

Problem to be Solved by the Invention

[0007] Regarding the conventional connection between a medical container and a transfusion tube, there exist the following problems.

10 [0008] In general, the operator opens the port immediately before connecting the connection cap to the connector, and hence the nutrient in the medical container comes into contact with ambient air. At this time, there is a risk in that impurities and unwanted bacteria derived from the ambient air may be mixed in the nutrient to cause contamination.

15 [0009] Further, there is a problem in that the nutrient leaks out from the medical container when the inside of the port is opened to the ambient air, and thus, there still remains some room to be improved from the viewpoint of hygiene and safety.

[0010] On the other hand, in order to perform nutrition therapy correctly, it is necessary to connect the connection cap and the transfusion tube side reliably.

20 However, there is a risk in that the nutrient container side may be erroneously connected to a different transfusion tube or the like arranged for another purpose, and hence it is also necessary to prevent this problem without fail.

[0011] The present invention has been achieved in view of the above-mentioned respective problems, and it is an object of the present invention to provide a medical
25 administering set capable of connecting a medical container to a tube reliably while holding liquid-tightness of the medical container, and preventing contamination and leakage of a liquid-like substance such as a nutrient stored in the medical container, thereby performing satisfactory nutrition therapy or transintestine nutrition therapy.

Means for Solving Problem

30 [0012] In order to achieve the above-mentioned object, the present invention relates to a medical administering set, including: a medical bag; a transfusion tube; and a connector for connecting the medical bag and the transfusion tube to each other. The

medical bag includes a storage section for storing a liquid-like substance and a port. The port includes a main section having a first locking section, a flow path of the liquid-like substance, and a sealing section for sealing the flow path. The connector has a second locking section capable of being locked with the first locking section. The
5 main section and the connector are moved relatively while the main section and the connector are in contact with each other in a liquid-tight state, whereby the first locking section and the second locking section are locked with each other, and sealing by the sealing section is broken to open the flow path.

[0013] Herein, the above-mentioned medical administering set may have the
10 following configuration: the port is a boat-shaped port, and the storage section is a bag-shaped resin film, the boat-shaped port being arranged so as to communicate with an inside of the storage section.

[0014] Further, the above-mentioned medical administering set may have the following configuration: the main section has an axial shape, the connector includes a
15 tube-shaped section in which the axial main section is capable of being inserted, and the main section and the connector are rotated relatively around an axis of the main section while the main section is inserted in the tube-shaped section of the connector to bring the tube-shaped section and the main section into contact with each other in a liquid-tight state, whereby the first locking section and the second locking section are
20 locked with each other, and the flow path is opened.

[0015] Further, the above-mentioned medical administering set can also have the following configuration: the sealing section is connected to the main section through intermediation of a connection section that is thinner than the main section, the main section, the sealing section, and the connection section are formed integrally of the
25 same material, and the sealing section is moved relatively with respect to the main section along with the rotation of the main section and the connector, whereby the connection section is broken and the sealing by the sealing section is broken to open the flow path.

[0016] Further, the above-mentioned medical administering set can also have the
30 following configuration: the sealing section includes at least one rib and is connected to the main section at the rib through intermediation of the connection section, a fitting groove is formed in the tube-shaped section of the connector, the rib being capable of

being fitted in the fitting groove when the connector and the main section are brought into contact with each other in a liquid-tight state, and the rib rotates with the connector to be broken during the rotation of the main section and the connector.

[0017] Further, the above-mentioned medical administering set can also have the following configuration: the main section includes a protrusion capable of being inserted in the tube-shaped section of the connector, and the sealing section is connected to an upper surface of the protrusion through intermediation of the connection section.

[0018] Further, the present invention relates to a medical bag storing a liquid-like substance, to be connected to a transfusion tube for transfusing the liquid-like substance. The medical bag includes: a storage section for storing the liquid-like substance; and a port. The port includes a main section including a first locking section, a flow path of the liquid-like substance, and a sealing section for sealing the flow path. The port is connected to the transfusion tube through use of a connector including a second locking section capable of being locked with the first locking section. The main section and the connector are moved relatively while the main section and the connector are in contact with each other in a liquid-tight state, whereby the first locking section and the second locking section are locked with each other, and sealing by the sealing section is broken to open the flow path.

[0019] Herein, the above-mentioned medical bag can also have the following configuration: the port is a boat-shaped port, and the storage section is a bag-shaped resin film, the boat-shaped port being arranged so as to communicate with an inside of the storage section.

[0020] Further, the above-mentioned medical bag can also have the following configuration: the main section has an axial shape, the connector includes a tube-shaped section in which the axial main section is capable of being inserted, and the main section and the connector are rotated relatively around an axis of the main section while the main section is inserted in the tube-shaped section of the connector to bring the tube-shaped section and the main section into contact with each other in a liquid-tight state, whereby the first locking section and the second locking section are locked with each other, and the flow path is opened.

[0021] Further, the above-mentioned medical bag can also have the following

configuration: the sealing section is connected to the main section through intermediation of a connection section that is thinner than the main section, the main section, the sealing section, and the connection section are formed integrally of the same material, and the sealing section is moved relatively with respect to the main section along with the rotation of the main section and the connector, whereby the connection section is broken and the sealing by the sealing section is broken to open the flow path.

[0022] Further, the above-mentioned medical bag may have the following configuration: the sealing section includes at least one rib and is connected to the main section at the rib through intermediation of the connection section, a fitting groove is formed in the tube-shaped section of the connector, the rib being capable of being fitted in the fitting groove when the connector and the main section are brought into contact with each other in a liquid-tight state, and the rib rotates with the connector to be broken during the rotation of the main section and the connector.

[0023] Further, the above-mentioned medical bag may have the following configuration: the rib is connected to the main section through intermediation of the connection section so as to be arranged in a radial shape in a plural number on the main section.

[0024] Further, the above-mentioned medical bag can also have the following configuration: the main section includes a protrusion capable of being inserted in the tube-shaped section of the connector, and the sealing section is connected to an upper surface of the protrusion through intermediation of the connection section.

Effects of the Invention

[0025] In the medical administering set of the present invention, the sealing section for sealing the flow path of the liquid-like substance is formed in the main section of the port arranged in the medical bag. The first locking section is arranged in the main section, and the connector capable of being locked with the first locking section is arranged on a transfusion port side.

[0026] When the medical administering set is used, the operator first brings the main section of the port and the connector into contact with each other in a liquid-tight state. Then, the operator moves the port and the connector relatively in a predetermined direction while keeping the liquid-tight state, thereby engaging the locking sections

(first and second locking sections) with each other. Such a locking operation (locking) releases the sealing of the flow path in the sealing section while the flow path is shut off from the outside, and the liquid-like substance in the medical bag becomes able to flow to the connector side (transfusion tube side) through the port.

5 [0027] Therefore, in the medical administering set according to the present invention, the liquid-like substance in the medical bag does not come into contact with ambient air at least until the port and the connector are locked with each other. Further, when the flow path through which the liquid-like substance flows is opened to the transfusion tube side, the port and the connector are constantly locked with each other,
10 and the flow path is shut off from ambient air to be kept in the liquid-tight state.

[0028] Accordingly, the medical administering set according to the present invention can reduce the problem that the liquid-like substance comes into contact with ambient air and is mixed with impurities to cause contamination and can suppress the problem that the liquid-like substance leaks to contaminate the outside when the flow path is
15 opened. Thus, a nutrition administering therapy involving high-degree hygiene management can be performed.

[0029] In particular, according to the present invention, operations of detaching a seal for sealing attached to an end of the port, opening the port, and the like prior to use are not required unlike the conventional example. Therefore, the risk in that the
20 liquid-like substance is contaminated as a result of the opening operation can be avoided.

[0030] Further, in the medical bag of the present invention, the port can be directly fixed to the connector without using a special cap or the like, and hence a parts count can be reduced and production cost can be suppressed. Further, in the medical
25 administering set according to the present invention, owing to the relatively small parts count, the contact areas of the medical bag, the connector, and the like contacting the liquid-like substance are small. Also in this respect, the effect of preventing the occurrence of contamination can be expected.

[0031] Further, the port and the connector cannot be connected so as to be locked
30 with each other without using the first and second locking sections which are a dedicated combination. Thus, the respective connectors strictly select connection counterparts, and hence the operator can prevent the problem of erroneously

connecting the boat-shaped port to another transfusion tube side in advance. The medical administering set according to the present invention exhibits high safety also in this respect.

[0032] Note that, although the medical administering set according to the present invention exhibits the above-mentioned outstanding effect when the port and the connector are used in combination as described above, the medical administering set is also useful in the case where the port is used alone because the liquid-like substance stored in the medical bag can be shut off from ambient air and held in the liquid-tight state due to the presence of the sealing section of the boat-shaped port.

Brief Description of Drawings

[0033] [FIG. 1] FIG. 1 is a schematic view showing a configuration of a nutrient administering set 1 according to Embodiment 1.

[FIG. 2] FIG. 2 is a view showing each configuration and a connection method of a boat-shaped port 15 (with a male connector) and a connector 20 (with a female connector).

[FIG. 3] FIGS. 3(a) and 3(b) are respectively an outer appearance view and a sectional view each showing a configuration of the boat-shaped port 15.

[FIG. 4] FIGS. 4(a) and 4(b) are respectively an outer appearance view and a sectional view each showing a configuration of the connector 20.

[FIG. 5] FIGS. 5(a), 5(b), and 5(c) are views illustrating a locking process of the boat-shaped port 15 and the connector 20.

[FIG. 6] FIGS. 6(a) and 6(b) are partial sectional views each showing the positional relationship between the connector 20 and the boat-shaped port 15 before and after locking.

[FIG. 7] FIGS. 7(a) and 7(b) are top views each showing the positional relationship between the connector 20 and the boat-shaped port 15 before and after locking.

[FIG. 8] FIG. 8 is a view showing a configuration of the connector 20A and the boat-shaped port 15A according to Embodiment 2.

Description of the Invention

[0034] The embodiments of the present invention are hereinafter described, and

needless to say, the present invention is not limited to the embodiments. The present invention can be appropriately altered within a range not departing from the technical concept of the present invention.

[0035] <Embodiments>

5 (Nutrient administering set 1)

FIG. 1 is a view showing a configuration of a medical administering set (nutrient administering set 1) according to Embodiment 1. FIG. 2 is a view showing each configuration and a connection method of a boat-shaped port 15 and a connector 20 in the nutrient administering set 1. Note that, although a nutrient is administered in this case, the nutrient as used herein is not limited to a nutrient in a strict sense and also includes a liquid diet and a solution such as physiologic saline.

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[0036] The nutrient administering set 1 shown in FIG. 1 includes, as constituent elements, a medical bag 10 that is an example of a medical container (nutrient container), the connector 20, and a transfusion tube 30.

15 [0037] The medical bag 10 includes a storage section 100 and the boat-shaped port 15.

[0038] The storage section 100 is formed of a bag-shaped soft container obtained by attaching respective peripheral edges of two rectangular resin films to each other by thermocompression bonding, and a liquid-like transintestine nutrient is stored in the storage section 100.

20 [0039] The boat-shaped port 15 is molded integrally with a resin material. Although a flow path 159 for allowing a liquid-like substance to flow therethrough is formed in the boat-shaped port 15 as shown in FIG. 3(b), and the boat-shaped port 15 is usually sealed. In the medical bag 10, the boat-shaped port 15 is interposed in an attached section of the resin film corresponding to one side of the storage section 100 so that the flow path 159 communicates with the inside of the storage section 100. The inside of the medical bag 10 before use is sealed, and thus the transintestine nutrient is kept in a sterile state.

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[0040] The transfusion tube 30 is a transfusion line formed of a resin material such as a silicone resin or polyvinyl chloride having appropriate flexibility. As shown in FIG. 1, the connector 20 for connection to the boat-shaped port 15 is arranged at an upstream end of the transfusion tube 30. An insertion section 33 formed with a

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predetermined port for administering a nutrient to a patient side is arranged at a downstream end of the transfusion tube 30. A known drip tube 31 and a flow rate adjuster (Klemme) 32 for adjusting a flow rate are arranged midway along the transfusion tube 30.

5 [0041] When the nutrient administering set 1 is used, the storage section 100 is hung on a predetermined stand with the boat-shaped port 15 directed downward as shown in FIG. 1. Then, as shown in FIG. 2, the connector 20 is connected to the boat-shaped port 15 connected to the boat-shaped port 15, and the connection state is locked. After that, the nutrient in the storage section 100 is transfused into the patient side through
10 the transfusion tube 30.

[0042] As the feature of the medical bag 10, the boat-shaped port 15 also serves to connect the storage section 100 side to the connector 20. In the nutrient administering set 1 shown in FIG. 2, the boat-shaped port 15 and the connector 20 are connected to each other to form a paired connector set. When an operator performs a
15 predetermined locking operation described later during use, the port 15 is combined with the connector 20, and the internal sealing of the medical bag 10 is broken along with the locking operation. As a result, it becomes possible for the nutrient in the storage section 100 to be transfused to the transfusion tube 30 side through the boat-shaped port 15.

20 [0043] Therefore, in the nutrient administering set 1, when the boat-shaped port 15 and the connector 20 are connected to each other during use, the nutrient in the storage section 100 does not come into contact with ambient air. Thus, the nutrient can be kept in a remarkably hygienic manner immediately before administration or during administration, and hence the nutrient with high safety can be administered to
25 the patient.

[0044] Each configuration of the boat-shaped port 15 and the connector 20 is hereinafter described in detail.

(Boat-shaped port 15)

FIG. 3(a) is a view showing each outer appearance of the boat-shaped port (port with a male connector) 15 and a protection cover 16. FIG. 3(b) is a sectional
30 view showing the inner configuration of the boat-shaped port 15. For illustrative purpose, the boat-shaped port 15 of FIG. 2 is shown upside down.

[0045] The boat-shaped port 15 is produced integrally by subjecting various kinds of known resin materials such as polycarbonate (PC), polyethylene terephthalate (PET), polyethylene (PE), and polypropylene to injection molding.

5 [0046] The boat-shaped port 15 includes, as a basic structure, an externally axial port main section 150, and the port main section 150 and a sealing section 155 are connected to each other through intermediation of connection sections 1550a to 1550c.

[0047] The inside of the axial port main section 150 is hollow as shown in FIG. 3(b), and the flow path 159 is formed in the port main section 150. The flow path 159 serves to transfuse the nutrient in the storage section 100 into the outside at a time of
10 nutrient administration, and before nutrient administration (use), the flow path 159 is sealed with the sealing section 155.

[0048] The port main section 150 has a boat-shaped port base 151 having a predetermined height. On a ceiling surface 152 of the port base 151, a stepped section 162 and a protrusion 160 are formed continuously in the stated order.

15 [0049] The stepped section 162 is a cylindrical body having a diameter smaller than that of the port base 151. A pair of locking tabs 153, 154 protrudes from a side surface in the vicinity of an upper edge of the stepped section 162.

[0050] Each of the locking tabs 153, 154 is a plate-shaped body having a principal plane parallel to the ceiling surface 152, and convex portions 1531, 1541 (1541 is not
20 shown) protrude toward the ceiling surface 152.

[0051] A ceiling surface of the stepped section 162 serves as an abutment surface 161 for abutting on an abutment surface 200 of the connector 20.

[0052] The protrusion 160 is formed so as to protrude in a shape of a truncated cone at the center of the abutment surface 161. The shape of a circumferential surface of
25 the protrusion 160 is designed so as to be inserted in a connector main section 21 in accordance with the shape of an inner surface thereof and is adjusted in such a manner that, when the boat-shaped port 15 is inserted in the connector 20, the boat-shaped port 15 and the connector 20 can come into contact with each other in a liquid-tight state on a contact site of the protrusion 160

30 [0053] On an upper surface of the port main section 150 (upper surface of the protrusion 160), the sealing section 155 has a configuration in which at least one (three in this case) ribs 155a to 155c stand in a radial shape (three-arrow shape) so that the

respective ends of the ribs 115a to 155c face each other on an axis core of the protrusion 160 and the respective principal planes of the ribs 155a to 155c form an angle of 120° therebetween. Specifically as shown in FIG. 3(b), the sealing section 155 is connected to the upper surface of the protrusion 160 on the port main section 150 side through intermediation of the connection sections (thin sections) 1550a to 1550c formed with a thickness smaller than a member thickness of the port main section 150 in a root region of the respective ribs 155a to 155c.

[0054] There are provided slits 156a to 156c, each having a strip-shaped cross-section and communicating with the flow path 159, immediately below the respective ribs 155a to 155c (see FIG. 6(b)).

[0055] Further, an opening 158 communicating with the flow path 159 is provided in the boat-shaped port 15.

[0056] The protection cover 16 protects the boat-shaped port 15 in the medical bag 10 before use, and includes a cover main section 165 for covering the protrusion 160, the stepped section 162, and the sealing section 155, and locking flanges 166, 167 capable of being locked with the locking tabs 153, 154. Similarly to the boat-shaped port 15, the protection cover 16 is also formed integrally by subjecting a resin material to injection molding. As shown in FIG. 3(a), the protection cover 16 can be separated from the boat-shaped port 15 by rotating the protection cover 16 in an arrow direction (direction opposite to a second direction of FIG. 2) around the stepped section 162.

(Connector 20)

Returning to FIG. 2, similarly to the boat-shaped port 15, the connector 20 is formed integrally by subjecting the same material (resin material in this case) to injection molding. The connector 20 includes the connector main section 21 that is a hollow tube-shaped section having an outer appearance tapered toward an end. A pair of plate-shaped operation sections 205, 206 is provided on an outer circumferential surface of the connector main section 21, and the operator operates the operation sections 205, 206 by holding them with fingers. The inside of the connector main section 21 is formed in accordance with the shape of the port main section 150 of the connector 20, which is to be inserted in the connector main section 21 in a liquid-tight state. The transfusion tube 30 extends from an end section 2033 (lower end in FIG. 2) of the connector main section 21. On the other hand, a plate-shaped connector base

22 is arranged at an upper end of the connector main section 21 on the upstream side in the transfusion direction so that each principal plane of the connector base 22 is orthogonal to an axis core of the connector 20. One principal plane (upper principal plane in FIG. 2) of the connector base 22 serves as the abutment surface 200 for
 5 abutting on the abutment surface 161 of the boat-shaped port 15.

[0057] FIG. 4(a) is an outer appearance view showing a configuration of the connector 20 when viewed from the abutment surface 200 side. FIG. 4(b) is a sectional view showing an inner configuration of the connector 20 (sectional view passing through a fitting groove 2030b, with an angle around an axis core of the
 10 connector main section 21 being 180°). FIGS. 5(a), 5(b), and 5(c) are views each showing a locking process between the locking tab 153 and a locking flange 202 when viewed from an axis core side of the boat-shaped port 15 (for illustrative purpose, as the locking tab 153, a portion continued from the stepped section 160 is shown in a cross-section).

15 [0058] As shown in FIG. 4(a), the connector base 22 includes, as a basic structure, a disc body in which an opening 2031 communicating with the connector main section 21 is provided at the center, and has a configuration in which a circumferential portion protrudes outward with the axis core of the connector main section 21 being a symmetric axis. In the respective protruding circumferential portions, a pair of
 20 locking flanges 201, 202 capable of being locked with the pair of locking tabs 153, 154 of the boat-shaped port 15 is formed.

[0059] As shown in FIGS. 4 and 5, the locking flanges 201, 202 include flange main bodies 2012, 2022, overhang sections 2013, 2023, locking tab abutment sections 2011, 2021, and the like. The flange main bodies 2012, 2022 are ribs standing along an
 25 edge of the abutment surface 200.

[0060] The overhang sections 2013, 2023 are plate bodies arranged at a required height with respect to the abutment surface 200 along side surfaces of the flange main bodies 2012, 2022 so as to allow the locking tabs 153, 154 to enter between the flange main bodies 2012, 2022 and the abutment surface 200.

30 [0061] The locking tab abutment sections 2011, 2021 are square pillars arranged so as to be continued to the overhang sections 2013, 2023 and protrude from the flange main bodies 2012, 2022 to the axis core of the connector 20.

[0062] Herein, in the continued portions between the locking tab abutment sections 2011, 2021 and the overhang sections 2013, 2023, concave portions 2014, 2024 (2014 is not shown due to the arrangement relationship) are formed by cutting away the overhang sections 2013, 2023 in a thickness direction. The concave portions 2014, 2024 are sites in which the convex portions 1531, 1541 of the locking tabs 153, 154 are drawn and fitted.

[0063] Note that, for convenience of a mold to be used for molding a resin to form the connector 20, openings 2010, 2020 are formed in portions of the abutment surface 200 immediately below the overhang sections 2013, 2023.

[0064] Further, a Japanese character meaning “stop”, an arrow indicating a rotation direction, and the like are displayed on a display screen 204 corresponding to a back surface of the abutment surface 200 so that the operator can correctly recognize the direction in which the connector 20 is locked with the boat-shaped port 15. Needless to say, contents to be displayed on the display screen 204 are not limited to the above-mentioned contents, and the display may be omitted.

[0065] On the other hand, the inside of the connector main section 21 is formed in such a shape that the port main section 150 can be inserted. Further, as shown in FIGS. 4(a) and 4(b), three fitting grooves 2030a to 2030c are formed at an equal interval (at which the fitting grooves 2030a to 2030c respectively form an angle of 120° around the axis core of the connector main section 21) by cutting away an inner wall in a thickness direction in the vicinity of the opening 2031. The fitting grooves 2030a to 2030c are means in which the respective ribs 155a to 155c provided with the boat-shaped port 15 are fitted.

[0066] An engagement stepped section 2032 is provided between the opening 2031 and the end section 2033 of the connector main section 21 by reducing the inner diameter in a stepped shape toward the end section 2033 side. The engagement stepped section 2032 prevents the end of the transfusion tube 30 from coming off, and thus the connector 20 is integrally connected to the transfusion tube 30.

(Regarding effects at a time of nutrient administration)

A procedure for administering a nutrient into a patient through use of the nutrient administering set 1 having the above-mentioned configuration is described.

[0067] First, an operator such as a doctor or a nurse hangs one end of the medical bag

10 on a stand as shown in FIG. 1 and directs the boat-shaped port 15 downward. On the other hand, the operator inserts one end of the transfusion tube 30 into the connector 30 to engage one end of the transfusion tube 30 with the engagement stepped section 2032 in the connector main section 21 and allows the transfusion tube
5 30 to extend from the end section 2033. Alternatively, in the course of production or before shipping, the connector 20 may be connected to the transfusion tube 30 in advance.

[0068] On the other hand, the operator connects the insertion section 33 provided on the other end of the transfusion tube 30 to a predetermined tube end arranged on a
10 patient side.

[0069] Next, the operator holds the connector 20 with the abutment surface 200 directed upward in the arrangement relationship shown in FIG. 2. Then, the operator brings the abutment surface 200 of the connector 20 into abutment on the abutment surface 161 of the boat-shaped port 15 while avoiding the interference
15 between the locking flanges 201, 202 and the locking tabs 153, 154 and paying attention to an angle around the axis core of the connector 20 (see a first direction indicated by an arrow in a vertical direction in FIG. 2). Thus, the operator brings the connector 20 and the boat-shaped port 15 into contact with each other and moves them relatively. In this case, the protrusion 160 and the sealing section 155 (ribs 155a to
20 155c) of the boat-shaped port 15 are inserted in the connector main section 21.

[0070] As a result of the above-mentioned operation, an outer circumferential surface of the protrusion 160 comes into contact with an inner surface of the connector main section 21 in a liquid-tight state, and the inside of the connector main section 21 and the protrusion 160 and the sealing section 155 of the boat-shaped port 15 are shut off
25 from ambient air. Thus, the connection state between the connector 20 and the boat-shaped port 15 is formed.

[0071] Next, the operator fixes (locks) the connection state between the connector 20 and the boat-shaped port 15. Specifically, the operator holds the operation sections 205, 206 with fingers and rotates the connector 20 by an angle of 60° relative to the
30 boat-shaped port 15 along the axis core of the connector 20 (see the second direction indicated by an arrow of a curved line). In this case, the outer circumferential surface of the protrusion 160 and the inner circumferential surface of the connector main

section 21 slide over each other while keeping the liquid-tight state and rotate relatively around the axis core of the connector 20. Then, the locking tabs 153, 154 that have been positioned on the upstream side in the rotation direction from the overhang sections 2013, 2023 prior to the above-mentioned rotation operation enters
 5 between the abutment surface 200 and the overhang sections 2013, 2023 along with the rotation operation, and moves forward while pushing up the overhang sections 2013, 2023 in a direction leaving from the abutment surface 200 (see each arrow of FIG. 5(b)). Then, the locking tabs 153, 154 finally abut on the locking tab abutment sections 2011, 2021, and the movement of the locking tabs 153, 154 is inhibited. In
 10 this case, the convex portions 1531, 1541 of the locking tabs 153, 154 are fitted in the concave portions 2014, 2024 provided in the overhang sections 2013, 2023 (FIG. 5(c)). With this fitting, the locking operation (locking) between the connector 20 and the boat-shaped port 15 is completed.

[0072] After the completion of the locking operation, the connector 20 and the
 15 boat-shaped port 15 are locked with each other strongly in the connection state, and hence do not come off easily.

[0073] Herein, FIGS. 6(a) and 6(b) are views respectively showing an arrangement relationship between the connector 20 and the boat-shaped port 15 before locking and during locking, and a transfusion release mechanism by the ribs 155a to 155c (sealing
 20 section 155). FIGS. 6(a) and 6(b) respectively show the connector 20 as a sectional structure taken along lines forming an angle of 120° around the axis core of the connector main section 21 and passing through the fitting grooves 3020b, 3020c. Further, FIGS. 7(a) and 7(b) are front views respectively showing an arrangement relationship between the connector 20 and the boat-shaped port 15 before locking and
 25 during locking, when viewed from the connector end section 2033 along the axis core of the connector 20. In FIGS. 7(a) and 7(b), contours of the locking flanges 201, 202 are indicated by dotted lines.

[0074] As shown in FIG. 2 described above, immediately after the connector 20 is connected to the boat-shaped port 15, the ribs 155a to 155c are merely fitted in the
 30 fitting grooves 2030a to 2030c in the connector main section 21 (see FIGS. 6(a) and 7(a)). The operator operates the operation sections 205, 206 in this state to perform the above-mentioned locking operation. That is, the operator rotates the connector 20

with respect to the boat-shaped port 15 by an angle of 60° around the axis core of the connector main section 21 with the core axis being a rotation axis. Thus, each of the ribs 155a to 155c moves with the connector 20 while being fitted in the fitting grooves 2030a to 2030c and rotates around the rotation axis up to a position displaced by 60° from the original position. Along with the rotation, the connection sections 1550a to 1550c that are provided at the roots of the ribs 155a to 155c are pushed to be broken. Then, the slits 156a to 156c appear at positions facing the inside of the connector main section 21 (FIGS. 6(b) and 7(b)). FIG. 6(b) shows the boat-shaped port 15 in which the slits 156a to 156c appear after each of the ribs 155a to 155c is rotated to an angle displaced by 60° from the original position, with the axis core of the connector main section 21 being a rotation axis, and the connection sections 1550a to 1550c are broken. [0075] When the ribs 155a to 155c are rotated and the connection sections 1550a to 1550c are broken along with the locking operation as described above, the sealing of the flow path 159 by the sealing section 155 is broken, and the flow path 159 communicates with the connector 20 side through the slits 156a to 156c for the first time. During this time, the liquid-tight state between the outer circumferential surface of the protrusion 160 and the inner circumferential surface of the connector main section 21 is kept. The medical bag 10 is hung with the boat-shaped port 15 directed downward during use as shown in FIG. 1, and hence the nutrient in the storage section 100 flows in the boat-shaped port 15 and the connector section 21 by virtue of the self weight and administered into the patient side through the transfusion tube 30. Thus, in the nutrient administering set 1, the nutrient administration can be started together with the completion of the locking operation between the connector 20 and the boat-shaped port 15. Therefore, even when the flow path 159 of the boat-shaped port 15 is opened, the nutrient is constantly shut off from ambient air.

[0076] Accordingly, impurities are reliably prevented from being mixed in the nutrient from ambient air through the slits 156a to 156c when the nutrient is administered into the patient, which is very effective from the viewpoint of hygienic supervision. Unlike the conventional configuration in which it is necessary to open a hole in the port of the medical bag or peel a seal before connecting the port to the connector 20, the nutrient administering set 1 can exhibit remarkably excellent safety

in terms of hygienic supervision in the following point: after the connector 20 and the boat-shaped port 15 are connected to each other, the sealing of the boat-shaped port 15 can be released simultaneously with the completion of the locking between the connector 20 and the boat-shaped port 15.

5 [0077] Further, in the nutrient administering set 1, the boat-shaped port 15 can be connected and fixed directly to the connector 20 side merely by performing the above-mentioned predetermined operation, and it is not necessary to use a special cap and the like. Therefore, a parts count can be reduced and production cost can be suppressed. Further, owing to the relatively small parts count, the contact areas of
10 the medical bag 10, the connector 20, and the like contacting the liquid-like substance can be suppressed. Also in this respect, the nutrient administering set 1 can prevent the occurrence of contamination and exhibit high reliability.

[0078] Further, the connector 20 and the boat-shaped port 15 cannot be normally connected to and locked with each other without using the respective locking sections
15 (in this case, the locking tabs 153, 154 and the locking flanges 201, 202, the sealing section 155 and the fitting grooves 2030a to 2030c) constructed strictly with a dedicated combination. Thus, due to the presence of the strict connection selectivity, even when the operator erroneously tries to connect the boat-shaped port 15 to another transfusion line provided to the patient, the occurrence of a problem of erroneous
20 connection can be prevented reliably. Accordingly, the nutrient administering set 1 can exhibit outstanding safety also from the viewpoint of preventing human-induced malpractice.

[0079] Note the following: in the boat-shaped port 15, although the connection sections 1550a to 1550c are completely broken and the sealing section 155 is separated
25 in some cases due to the rotation of the connector 20, the ribs 155a to 155c are kept being fitted in the fitting grooves 2030a to 2030c, and hence the sealing section 155 separated from the boat-shaped port 15 will not flow to the transfusion tube 30 side.

[0080] Further, regarding the locking operation of the connector 20 and the boat-shaped port 15, and the opening operation of the flow path 159 involved in the
30 locking operation, it is appropriate to perform these operations by moving the elements relatively. Therefore, the operations may be performed in any of the case where the boat-shaped port 15 is moved with respect to the connector 20 and the case where the

connector 20 is moved with respect to the boat-shaped port 15.

[0081] <Embodiment 2>

Next, as Embodiment 2, FIG. 8 shows a configuration in which the connector 20A side is set to be a male connector and the boat-shaped port 15A side is set to be a female connector, respectively. Although the connector 20A and the boat-shaped port 15A are respectively shown in upper and lower parts of FIG. 8 for convenience of description, the vertical arrangement of the connector 20A and the boat-shaped port 15A becomes opposite during use as shown in FIGS. 1 and 2.

[0082] Unlike Embodiment 1, in the boat-shaped port 15A, a tube-shaped section 163 stands so as to surround the circumference of the abutment surface 152A that is an upper surface of a boat-shaped port base 151A. The inner diameter of the tube-shaped section 163 is adjusted so as to be matched with the outer diameter of a main section 21A of the connector 20A, and the main section 21A of the connector 20A is inserted (or press-fitted) in the tube-shaped section 163 during use.

[0083] A pair of locking tabs 153A, 154A having a configuration similar to that of the above-mentioned 153, 154 is formed on the circumference of an opening 164 of the tube-shaped section 163. A sealing section 155A similar to 155 is formed at the center of an abutment surface 161A through intermediation of connection sections similar to 1550a to 1550c, and slits communicating with a flow path of the boat-shaped port 15A are formed immediately below the respective ribs 155a to 155c. The flow path and the slits respectively have configurations similar to those of 159 and 156a to 156c.

[0084] On the other hand, the connector 20A includes the main section 21A and a pair of locking flanges 201A, 202A.

[0085] The main section 21A is a cylinder body. An abutment surface 200A that comes into abutment on the abutment surface 161A of the boat-shaped port 15A is provided as a lower surface of the main section 21A, and a display screen 204A is provided as an upper surface of the main section 21A.

[0086] A character and an arrow similar to those of 204 are displayed on the surface of the display screen 204A, and the transfusion tube 30 is connected to the center of the surface of the display screen 204A.

[0087] The locking flanges 201A, 202A are mechanisms similar to 201, 202. The locking flanges 201A, 202A are capable of being locked with the locking tabs 153, 154

and formed at an equal interval on a side surface of the main section 21A. In the configuration shown in FIG. 8, constituent elements of the locking flanges 201A, 202A are each covered with a box-shaped housing so as not to be seen from outside.

[0088] In the configuration shown in FIG. 8, although a circumferential rib

5 (tube-shaped section) surrounding the circumference of the display screen 204A stands, the circumferential rib is not necessarily required.

[0089] A fitting groove 2030A in a radial shape (three-arrow shape) is formed at the center of the abutment surface 200A, the fitting groove 2030A having a shape allowing the respective ribs 155a to 155c of the sealing section 155 to be fitted therein.

10 [0090] Further, a total of three connector holes L1, L2, L3 is formed in the main section 21A so as to pass through the abutment surface 200A and the display screen 204A in an axial direction of the cylinder. The connector holes L1, L2, L3 are formed so that each opening on the abutment surface 200A side can communicate with each of the slits formed immediately below the sealing section 155 and each opening on the

15 display screen 204A side can communicate with the inside of the transfusion tube 30 after the connector 20A is locked with the boat-shaped port 15A.

[0091] The connector holes L1, L2, L3 have a circular cross-section herein. However, the connector holes L1, L2, L3 may be adjusted, for example as follows: the connector holes L1, L2, L3 are designed so as to have a rectangular cross-section or the number

20 of holes of the connector is increased.

[0092] When the boat-shaped port 15A and the connector 20A having the above-mentioned configurations are used, various effects substantially similar to those of the nutrient administering set 1 are also exhibited.

[0093] That is, when the operator connects the connector 20A to the boat-shaped port

25 15A, the operator pushes the main section 21A of the connector 20A into the tube-shaped section 163 of the boat-shaped port 15A while taking care that the locking tabs 153A, 154A and the locking flanges 201A, 202A do not interfere with each other. Then, the operator fits the sealing section 155A in the fitting groove 2030A and pushes the connector main section 21A into the tube-shaped section 163 completely until the

30 abutment surfaces 200A, 161A come into abutment on each other.

[0094] As a result of the above-mentioned operation, the side surface of the connector main section 21A comes into contact with the inner surface of the tube-shaped section

163 in a liquid-tight state, and thus the connector 20A and the boat-shaped port 15A are connected to each other.

[0095] Then, the operator performs a locking operation by rotating the connector 20A to an angle of 60° around the axis core of the connector 20A while keeping the
5 connection state to allow the locking tabs 153A, 154A to be respectively locked with the locking flanges 201A, 202A. Along with the locking operation, the sealing section 155A fitted in the fitting section 2030A rotates and moves, and the connection sections are broken, with result that the slits appear so as to face the connector holes L1 to L3. Thus, the nutrient in the storage section 100 becomes capable of flowing to the
10 transfusion tube 30 side through the connector holes L1 to L3.

[0096] By virtue of the above-mentioned operation, in Embodiment 2, the sealing of the boat-shaped port 15A can be released without causing the nutrient in the storage section 100 to contact ambient air during use in the same way as in Embodiment 1. Accordingly, the contamination of the nutrient caused by mixing of foreign matters is
15 prevented, and the nutrient can be administered to the patient hygienically. Further, the sealing of the boat-shaped port 15A is released only when the boat-shaped port 15A and the connector 20A are connected to each other, and hence the problem of leakage of the nutrient from the boat-shaped port 15A to the outside can also be prevented.

[0097] Further, in Embodiment 2, the boat-shaped port 15A and the connector 20A
20 have strict connection selectivity in terms of the configurations, and hence Embodiment 2 also exhibits the effect of reliably preventing a problem of erroneously connecting the boat-shaped port 15A to a different transfusion tube.

[0098] FIG. 8 shows the configuration in which the fitting groove 2030A and the connector holes L1 to L3 are formed in the connector 20A. Instead of this
25 configuration, a cylindrical space (flow path) communicating with the transfusion tube 30 may be formed in the connector main section 21A, and the fitting grooves 2030a to 2030c in which the ribs 155a to 155c can be fitted may be formed on a cylindrical inner wall of the cylindrical space.

<Other matters>

30 Although the above-mentioned embodiment shows the sealing section 155 obtained by combining three ribs 155a to 155c in a radial shape (three-arrow shape), the number of the ribs may be one or two, or at least four without being limited to

three.

[0099] Further, the following may be performed: rods (columnar bodies) are allowed to stand with the longitudinal directions thereof being in parallel with the axis core of the connector instead of providing the ribs; connection sections made of thin portions are formed around root portions of the rods; and holes corresponding to the slits are formed immediately below the rods. In this case, for example, concave portions in which the rods can be inserted are formed in the connector instead of the fitting grooves in such a manner that each rod is broken at the root along with the locking operation, and the slits (holes) appear to release the sealing of the port. Alternatively, it is also possible to use a combination of a sealing section having a simple solid shape (rectangular solid, polygonal column, etc.) and a fitting groove in which the sealing section can be fitted. Note that, care should be taken so that the liquid-tight state is kept even after the connector is connected to the boat-shaped port to prevent the inside of the connector main section, the flow path of which is to be opened, from contacting ambient air even in the case of adopting any configuration.

[0100] Note that, in order to enhance the liquid-tightness between the boat-shaped port and the connector, for example, a sealing member such as packing or a silicon material may be formed on any of the abutment surface of the boat-shaped port, the surface of the protrusion, and the like. Further, it is also effective to perform surface treatment for flattening the contact surface between the boat-shaped port and the connector.

[0101] Further, regarding the boat-shaped port, even when the sealing section is provided directly on the abutment surface without providing the protrusion on the abutment surface, the flow path can be prevented from coming into contact with ambient air when the flow path is opened. However, in order to ensure the excellent liquid tightness between the boat-shaped port and the connector even before locking, it is desired to provide the protrusion to increase the liquid-tight contact area between the boat-shaped port and the connector. Therefore, it is preferred to bring the tube-shaped section and the connector main section into liquid-contact with each other, and the like, as in Embodiment 2.

[0102] Further, the connector and the boat-shaped port may be locked with each other by locking means other than the locking of the locking tabs and the locking

flanges. For example, the connector and the boat-shaped port may be locked with each other by threaded locking.

[0103] The medical administering set of the present invention exhibits the most remarkable effect in the case where the male connector and the female connector are used together as a dedicated combination as in the illustrated boat-shaped port 15 and the connector 20. However, even in the case where the storage section 100 with the boat-shaped port 15 is used as a single element, the medical administering set of the present invention has an outstanding advantage in that a high sealing property in the bag 100 can be exhibited until the boat-shaped port 15 is locked with the connector 20, owing to the adoption of the sealing section 155.

[0104] In the embodiment, although the container made of a soft resin film is illustrated as the storage section 100, this is merely an example of the medical container, and the material is not limited. Other known medical containers such as a paper package, a glass bottle, a metal container, and a syringe may be used.

[0105] Further, needless to say, the liquid-like substance to be stored in the container is not limited to a transintestine nutrient, and various liquid-like substances such as various nutrients to be administered to patients, other than those to be administered to the intravenous vein may be used.

Industrial Applicability

[0106] The medical administering set of the present invention can be widely applied when a liquid-like substance stored in a medical container is administered to a patient through use of a tube, for example, in a medical site where a transintestine nutrition therapy is performed, and thus the range of the applicability of the medical administering set can be said to be very wide.

Description of Reference Numerals

[0107]	L1, L2, L3	connector hole
	1	nutrient administering set (medical administering set)
	10	nutrient container (medical container)
	15	boat-shaped port (with a male connector)
30	15A	boat-shaped port (with a female connector)
	16	protective cover
	20	connector (female connector)

	20A	connector (male connector)
	21, 21A	connector main section
	22	connector base
	30	transfusion tube
5	31	drip tube
	32	flow rate adjuster (Klemme)
	33	insertion section
	150	boat-shaped port main section
	151, 151A	boat-shaped port base
10	153, 153A, 154, 154A	locking tab (first locking section)
	155, 155A	sealing section
	155a to 155c	rib
	156a to 156c	slit
	157	screw
15	158, 2031	opening
	159	flow path
	160	protrusion
	161, 161A, 200, 200A	abutment surface
	163	tube-shaped section
20	164	opening
	165	cover main section
	166, 167	locking flange
	201, 201A, 202, 202A	locking flange (second locking section)
	203	connector main section
25	204, 204A	display screen
	205, 206	operation section
	1550a to 1550c	connection section (thin portion)
	1531, 1541	convex portion
	2010, 2020	hole
30	2011, 2021	locking tab abutment section
	2012, 2022	flange main body
	2013, 2023	overhang section

2014, 2024	concave portion
2030a to 2030c, 2030A	fitting groove
2032	engagement stepped section
2033	end section

CLAIMS

- [1] A medical administering set, comprising: a medical bag; a transfusion tube; and a connector for connecting the medical bag and the transfusion tube to each other, wherein the medical bag includes a storage section for storing a liquid-like substance and a port,
- 5 the port includes a main section having a first locking section, a flow path of the liquid-like substance, and a sealing section for sealing the flow path,
- the connector has a second locking section capable of being locked with the first locking section,
- 10 the main section and the connector are moved relatively while the main section and the connector are in contact with each other in a liquid-tight state, whereby the first locking section and the second locking section are locked with each other, and sealing by the sealing section is broken to open the flow path.
- [2] The medical administering set according to claim 1, wherein the port is a boat-shaped port, and
- the storage section is a bag-shaped resin film, the boat-shaped port being arranged so as to communicate with an inside of the storage section.
- [3] The medical administering set according to claim 1, wherein the main section has an axial shape,
- the connector includes a tube-shaped section in which the axial main section is capable of being inserted, and
- the main section and the connector are rotated relatively around an axis of the main section while the main section is inserted in the tube-shaped section of the connector to bring the tube-shaped section and the main section into contact with each other in a liquid-tight state, whereby the first locking section and the second locking section are locked with each other, and the flow path is opened.
- 25
- [4] The medical administering set according to claim 3, wherein the sealing section is connected to the main section through intermediation of a connection section that is thinner than the main section,
- 30

the main section, the sealing section, and the connection section are formed integrally of the same material, and

the sealing section is moved relatively with respect to the main section along with the rotation of the main section and the connector, whereby the connection section
 5 is broken and the sealing by the sealing section is broken to open the flow path.

[5] The medical administering set according to claim 3, wherein the sealing section includes at least one rib and is connected to the main section at the rib through intermediation of the connection section,

10 a fitting groove is formed in the tube-shaped section of the connector, the rib being capable of being fitted in the fitting groove when the connector and the main section are brought into contact with each other in a liquid-tight state, and

the rib rotates with the connector to be broken during the rotation of the main section and the connector.

15

[6] The medical administering set according to claim 5, wherein the rib is connected to the main section through intermediation of the connection section so as to be arranged in a radial shape in a plural number on the main section.

20 [7] The medical administering set according to claim 4, wherein the main section includes a protrusion capable of being inserted in the tube-shaped section of the connector, and

the sealing section is connected to an upper surface of the protrusion through intermediation of the connection section.

25

[8] A medical bag storing a liquid-like substance, to be connected to a transfusion tube for transfusing the liquid-like substance, the medical bag comprising:

a storage section for storing the liquid-like substance; and

a port,

30

wherein a main section including a first locking section, a flow path of the liquid-like substance, and a sealing section for sealing the flow path are formed in the port,

the port is connected to the transfusion tube through use of a connector including a second locking section capable of being locked with the first locking section, and

5 the main section and the connector are moved relatively while the main section and the connector are in contact with each other in a liquid-tight state, whereby the first locking section and the second locking section are locked with each other, and sealing by the sealing section is broken to open the flow path.

[9] The medical bag according to claim 8, wherein the port is a boat-shaped port,
10 and

the storage section is a bag-shaped resin film, the boat-shaped port being arranged so as to communicate with an inside of the storage section.

[10] The medical bag according to claim 8, wherein the main section has an axial
15 shape,

the connector includes a tube-shaped section in which the axial main section is capable of being inserted, and

the main section and the connector are rotated relatively around an axis of the main section while the main section is inserted in the tube-shaped section of the
20 connector to bring the tube-shaped section and the main section into contact with each other in a liquid-tight state, whereby the first locking section and the second locking section are locked with each other, and the flow path is opened.

[11] The medical bag according to claim 10, wherein the sealing section is
25 connected to the main section through intermediation of a connection section that is thinner than the main section,

the main section, the sealing section, and the connection section are formed integrally of the same material, and

the sealing section is moved relatively with respect to the main section along
30 with the rotation of the main section and the connector, whereby the connection section is broken and the sealing by the sealing section is broken to open the flow path.

[12] The medical bag according to claim 10, wherein the sealing section includes at least one rib and is connected to the main section at the rib through intermediation of the connection section,

5 a fitting groove is formed in the tube-shaped section of the connector, the rib being capable of being fitted in the fitting groove when the connector and the main section are brought into contact with each other in a liquid-tight state, and

the rib rotates with the connector to be broken during the rotation of the main section and the connector.

10 [13] The medical bag according to claim 12, wherein the rib is connected to the main section through intermediation of the connection section so as to be arranged in a radial shape in a plural number on the main section.

[14] The medical bag according to claim 11, wherein the main section includes a
15 protrusion capable of being inserted in the tube-shaped section of the connector, and the sealing section is connected to an upper surface of the protrusion through intermediation of the connection section.