DESCRIPTION

MEDICAL FLEXIBLE CONTAINER AND NUTRIENT SUPPLY SYSTEM USING THE SAME

Technical Field

[0001] The present invention relates to a medical flexible container and a nutrient supply system using the same.

Background Art

[0002] Enteral nutrition and intravenous nutrition are known as methods for administering a nutrient and a medical agent to a patient via a non-oral route. In the enteral nutrition, a liquid material such as a nutritional supplement, a liquid diet, a medical agent, etc. is administered through a tube drawn from a nasal cavity to the stomach or the duodenum of a patient. In the intravenous nutrition, a liquid material including a nutrient component such as glucose and/or a medical component (such a liquid material is generally called an "infusion solution") is administered through an infusion circuit inserted into a vein of a patient.

[0003] In the enteral nutrition and the intravenous nutrition, a liquid material to be administered to a patient must be poured into an empty medical flexible container in advance.

[0004] FIG. 17 is a front view showing a schematic configuration of a conventional medical flexible container 900. FIG. 18 is a view showing a state of unsealing the medical flexible container 900 shown in FIG. 17 and opening a mouth section 922 at the top end of the container 900 while gripping both edges of the mouth section 922 with one hand. FIG. 19 is a view showing a state of pouring a liquid material into the medical flexible container 900 shown in FIG. 17.

[0005] The medical flexible container 900 includes: a storage section 921 that stores a liquid material; and a discharge port 930 having a through hole through which the liquid material stored in the storage section 921 is to be taken out. The storage section 921 is in the shape of a bag formed by putting two flexible sheets together and bonding the outer peripheries thereof together by heat sealing. The discharge port

930 is made of a relatively rigid resin material compared with the sheets constituting the storage section 921.

[0006] The liquid material is poured into the vacant medical flexible container 900 in the following manner. First, an upper portion of the mouth section 922 is cut off along a cut-off line 929 starting at a notch 928 to unseal the container, and the engagement of a zip 923 is released. Then, as shown in FIG. 18, the mouth section 922 is opened while the outer edges of the mouth section 922 being gripped with one hand. Thereafter, as shown in FIG. 19, while a container 998 containing a liquid material including a medical agent, a nutrient, etc. is being held with the other hand (not shown), the liquid material is poured into the storage section 921 through the mouth section 922.

Citation List

Patent Document

[0007] Patent Document 1: JP 2007-314245A

Disclosure of Invention

Problem to be Solved by the Invention

[0008] However, in the work of pouring a liquid material into the conventional medical flexible container 900, it is necessary to continue gripping the outer edges of the mouth section 922 with one hand to open the mouth section 922 and also hold the medical flexible container 900 from the start to the end of the pouring work. As the poured amount of the liquid material increases, the weight of the medical flexible container 900 gradually increases. Moreover, since the medical flexible container 900 is made of a flexible material including the mouth section 922, the mouth section 922 will be easily deformed with application of a large gripping force. This may causes problems such as dropping of the medical flexible container 900 and spilling the liquid material by failing to open the mouth section 922 sufficiently widely. Accordingly, the work of pouring the liquid material into the conventional medical flexible container 900 places large mental and physical burdens on the worker who performs this work.

[0009] In view of the above, it is desirable to provide a medical flexible container with a member with which the flexible container can be held stably with its mouth section

being kept open.

[0010] The sheets constituting the medical flexible container are generally low in mechanical strength. Therefore, it is desirable that, when such a member is provided, no stress concentration will occur due to open/close operation of the mouth section and due to the weight of the poured liquid material. Also, it is required to avoid degradation in the quality of the medical flexible container by the provision of such a member.

[0011] It is an objective of the present invention to provide a high-quality medical flexible container that can be held stably with its mouth section being opened widely during the work of pouring a liquid material into the container and is not likely to cause stress concentration. It is an another objective of the present invention to provide a nutrient supply system provided with such a medical flexible container.

Means for Solving Problem

[0012] The medical flexible container of the present invention includes: a flexible bag member includes at least two flexible resin sheets attached to each other and provided with an openable/closable mouth section at its top end; a discharge port provided at a bottom end of the flexible bag member; and a pair of open/close operation sections provided on the flexible bag member with their center portions loosened to form insertion paths through which a finger can be inserted. At least one of an upper end portion and a lower end portion of at least one of the pair of open/close operation sections is secured to an outer surface of the flexible bag member by heat sealing. A heat sealing region formed when the at least one end portion is secured by heat sealing includes the entirety of an end edge of the at least one end portion, and at intersection points of an outer periphery of the heat sealing region and both side edges of the open/close operation section, the outer periphery is inclined with respect to the length direction of the open/close operation section.

[0013] The nutrient supply system of the present invention includes the medical flexible container of the present invention described above.

Effects of the Invention

[0014] According to the present invention, by inserting fingers into the insertion

paths formed by the pair of open/close operation sections provided on the flexible bag member, the medical flexible container can be held stably while its mouth section being opened.

[0015] Also, since the heat sealing region formed when an end portion of the open/close operation section is secured by heat sealing includes the entirety of the end edge of the end portion, the end edge adheres tightly to the flexible resin sheet. Therefore, the touch and the appearance will not be degraded by the provision of the open/close operation section, and thus degradation in the quality of the medical flexible container can be prevented.

[0016] Moreover, the outer periphery of the heat sealing region is inclined with respect to the length direction of the open/close operation section at the intersection points with the side edges of the open/close operation section. Therefore, even if an external force acting toward stripping off the center portion of the open/close operation section from the flexible bag member is exerted on the center portion, occurrence of large stress concentration on the intersection points can be prevented.

Brief Description of Drawings

[0017] [FIG. 1] FIG. 1 is a perspective view of a medical flexible container of Embodiment 1 of the present invention.

[FIG. 2A] FIG. 2A is a front view of the medical flexible container of Embodiment 1 of the present invention.

[FIG. 2B] FIG. 2B is a right side view of the medical flexible container of Embodiment 1 of the present invention.

[FIG. 2C] FIG. 2C is a back view of the medical flexible container of Embodiment 1 of the present invention.

[FIG. 3] FIG. 3 is an exploded perspective view of the medical flexible container of Embodiment 1 of the present invention.

[FIG. 4] FIG. 4 is a view showing a schematic configuration of an enteral nutrient supply system including the medical flexible container of Embodiment 1 of the present invention.

[FIG. 5] FIG. 5 is a perspective view showing a state of opening a mouth section of the medical flexible container of Embodiment 1 of the present invention

while holding the container with one hand.

[FIG. 6] FIG. 6 is a perspective view showing a state of pouring a liquid material into the mouth section of the medical flexible container of Embodiment 1 of the present invention while holding the container with one hand.

[FIG. 7] FIG. 7A is an enlarged view of portion 7A in FIG. 2A showing an upper end portion of an open/close operation section on the front side and a heat sealing region for heat sealing in Embodiment 1 of the present invention. FIG. 7B is an enlarged view of portion 7B in FIG. 2C showing the upper end portion of the open/close operation section on the back side and a heat sealing region for heat sealing in Embodiment 1 of the present invention.

[FIG. 8] FIG. 8A is an enlarged view of portion 8A in FIG. 2A showing a lower end portion of the open/close operation section on the front side and a heat sealing region for heat sealing in Embodiment 1 of the present invention. FIG. 8B is an enlarged view of portion 8B in FIG. 2C showing the upper end portion of the open/close operation section on the back side and a heat sealing region for heat sealing in Embodiment 1 of the present invention.

[FIG. 9] FIG. 9A is an enlarged view of an upper end portion of an open/close operation section on the front side and a heat sealing region for heat sealing in an comparative example. FIG. 9B is an enlarged view of an upper end portion of an open/close operation section on the front side and a heat sealing region for heat sealing in another comparative example.

[FIG. 10] FIG. 10A is an enlarged view of an upper end portion of an open/close operation section on the front side and a heat sealing region for heat sealing in Embodiment 2 of the present invention. FIG. 10B is an enlarged view of a lower end portion of the open/close operation section on the front side and a heat sealing region for heat sealing in Embodiment 2 of the present invention.

[FIG. 11] FIG. 11 is a perspective view of a medical flexible container of Embodiment 3 of the present invention.

[FIG. 12A] FIG. 12A is a front view of the medical flexible container of Embodiment 3 of the present invention.

[FIG. 12B] FIG. 12B is a right side view of the medical flexible container of Embodiment 3 of the present invention.

[FIG. 13] FIG. 13 is an enlarged view of an upper end portion of an open/close operation section on the front side and a heat sealing region for heat sealing in Embodiment 3 of the present invention.

[FIG. 14] FIG. 14 is a perspective view of a medical flexible container of Embodiment 4 of the present invention.

[FIG. 15A] FIG. 15A is a front view of the medical flexible container of Embodiment 4 of the present invention.

[FIG. 15B] FIG. 15B is a right side view of the medical flexible container of Embodiment 4 of the present invention.

[FIG. 16] FIG. 16 is an exploded perspective view of the medical flexible container of Embodiment 4 of the present invention.

[FIG. 17] FIG. 17 is a front view showing a schematic configuration of a conventional medical flexible container.

[FIG. 18] FIG. 18 is a view showing a state of opening a mouth section of the medical flexible container shown in FIG. 17 while gripping the mouth section with one hand.

[FIG. 19] FIG. 19 is a view showing a state of pouring a liquid material into the medical flexible container shown in FIG. 17.

Description of the Invention

[0018] According to the present invention, at least one of end portions of an open/close operation section secured to a flexible bag member by heat sealing satisfies the following two conditions.

[0019] First, the heat sealing region formed when the end portion is secured by heat sealing includes the entirety of the end edge of the end portion (hereinafter, this condition is referred to as the "first condition"). The phrase that the heat sealing region "includes" the entirety of the end edge means that the entirety of the end edge is present inside the heat sealing region (including the case where part of the end edge is located on the outer periphery of the heat sealing region). Preferably, it means that the entirety of the end edge is present inside the outer periphery of the heat sealing region without being in contact with the outer periphery.

[0020] Secondly, at the points of intersection of the outer periphery of the heat sealing

region and the side edges of the open/close operation section, the outer periphery is inclined with respect to the length direction of the open/close operation section (hereinafter, this condition is referred to as the "second condition"). The phrase that the outer periphery is "inclined" with respect to the length direction of the open/close operation section at the intersection points means that the tangent of the outer periphery at each intersection point is neither parallel nor vertical to the length direction of the open/close operation section. The length direction of the open/close operation section refers to the direction of the line connecting the upper and lower end portions of the open/close operation section secured to the flexible bag member.

[0021] According to the present invention, preferably, the heat sealing region has an approximate arc perimeter and a line connecting both ends of the approximate arc perimeter, and the approximate arc perimeter intersects with the side edges of the open/close operation section. Having this shape, even if an external force acting toward stripping off the center portion of the open/close operation section from the flexible bag member is exerted on the center portion in any direction, it is possible to prevent occurrence of large stress concentration, not only at the intersection points of the outer periphery of the heat sealing region and the side edges of the open/close operation section, but also at other positions.

[0022] Alternatively, the heat sealing region may have a shape of an approximate trapezoid, and oblique sides of the approximate trapezoid may intersect with the side edges of the open/close operation section. Having this shape, since the shape of the mold used at heat sealing can be simple, the mold can be easily produced.

[0023] The pair of open/close operation sections may be produced as separate members from the flexible resin sheets constituting the flexible bag member. In this case, preferably, the upper and lower end portions of the pair of open/close operation sections are secured to outer surfaces of the flexible bag member by heat sealing.

[0024] Preferably, the upper end portions of the pair of open/close operation sections are secured to outer surfaces of the flexible bag member at the heat sealing regions by heat sealing, the heat sealing region satisfying the first and second conditions described above. This can prevent occurrence of large stress concentration in the upper end portions on which a large force is often exerted.

[0025] Alternatively, the pair of open/close operation sections may be produced

integrally with the flexible resin sheets constituting the flexible bag member. In this case, preferably, the lower end portions of the pair of open/close operation sections are secured to outer surfaces of the flexible bag member by heat sealing. Thus, since the upper end portions of the open/close operation sections on which a large force is often exerted are produced integrally with the flexible resin sheets, the connection strength between the open/close operation sections and the flexible resin sheets at the end portions improves.

[0026] Preferred embodiments of the present invention will be described hereinafter in detail. Naturally, however, the present invention is not limited to the embodiments to follow. Note that, in the drawings referred to in the following description, only major components necessary for description of the present invention are shown in a simplified manner, among the components constituting the embodiments of the present invention, for convenience of the description. Accordingly, the present invention may include any given component not shown in the drawings. Note also that the dimensions in the drawings are not close representations of the actual dimensions, dimension radios, etc.

[0027] (Embodiment 1)

FIG. 1 is a perspective view of a medical flexible container 1 of Embodiment 1 of the present invention. FIG. 2A is a front view of the medical flexible container 1, FIG. 2B is a right side view of the medical flexible container 1, and FIG. 2C is a back view of the medical flexible container 1. FIG. 3 is an exploded perspective view of the medical flexible container 1. As used herein, the "upper" side (the upper side of the paper of FIG. 1) and the "lower" side (the lower side of the paper of FIG. 1) of the medical flexible container 1 are defined in terms of the actual use state. Also, the lateral direction of the medical flexible container 1 as viewed from the front (see FIG. 2A) and the back (see FIG. 2C) is referred to as the "width" direction.

[0028] As shown in FIGS. 1 and 2A to 2C, the medical flexible container 1 of this embodiment includes a flat-bag shaped flexible bag member 20 and a discharge port 30 secured to the bottom end of the flexible bag member 20.

[0029] The flexible bag member 20 includes a storage section 21 for storing a liquid material and a mouth section 22 communicating with the storage section 21. The mouth section 22 has a zip 23 (an engaging portion that can be opened/closed again;

also referred to as a "zip seal") crossing the mouth section 22 in the width direction to render the mouth section 22 reversibly openable/closable. The flexible bag member 20 also has a hanging section 26 located above the mouth section 22. A hanging hole 27 is formed in the hanging section 26 for use at the time of hanging the medical flexible container 1 from a stand, etc.

[0030] As shown in FIGS. 2A and 2C, the vertical axis passing through the hanging hole 27 and the discharge port 30 is the center axis 1a of the medical flexible container 1. In this embodiment, the center axis 1a bisects, in the width direction, the portion of the flexible bag member 20 located below the position of a cut 20c to be described later.

[0031] As shown in FIG. 3, the flexible bag member 20 is formed by putting two flexible resin sheets 20a and 20b together and heat-sealing the peripheries of the sheets mutually, for example. The reference numeral 24 in FIGS. 1 and 2A to 2C denotes the heat-seal regions of the two flexible resin sheets 20a and 20b.

[0032] In FIG. 3, the reference numerals 23a and 23b denote zip tapes constituting the zip 23. The zip tapes 23a and 23b are secured to the surfaces (inner surfaces) of the flexible resin sheets 20a and 20b facing each other by a known method such as heat sealing.

[0033] A scale 25 is provided on the surface of the flexible resin sheet 20a opposite to the surface facing the flexible resin sheet 20b for checking the amount of a liquid material poured in the flexible bag member 20. The scale 25 is drawn along the center axis 1a. The hanging section 26 is formed on the flexible resin sheet 20b. As used herein, the outer surface of the flexible resin sheet 20a (the surface that does not face the flexible resin sheet 20b) on which the scale 25 is provided is referred to as the "front" of the medical flexible container 1 and the outer surface of the flexible resin sheet 20b (the surface that does not face the flexible resin sheet 20a) is referred to as the "back" of the medical flexible container 1.

[0034] The discharge port 30 is in the shape of a tube, for example, having a through hole in the center, and is secured to the flexible bag member 20 by being sandwiched between the flexible resin sheets 20a and 20b. The through hole of the discharge port 30 allows the inside of the flexible bag member 20 to communicate with the outside. The discharge port 30 can be integrated with the flexible resin sheets 20a and 20b by

heat-sealing the flexible resin sheets 20a and 20b in the heat-seal regions 24 while the discharge port 30 being placed between the flexible resin sheets 20a and 20b, for example.

[0035] Open/close operation sections 40a and 40b are secured to the surfaces of the flexible resin sheets 20a and 20b opposite to the surfaces thereof facing each other (i.e., the outer surfaces of the sheets 20a and 20b). As shown in FIGS. 2A and 2C, the open/close operation sections 40a and 40b are placed along the center axis 1a, and are each made of a sheet-like member of a flexible resin, for example. Upper end portions 42a and 42b and lower end portions 43a and 43b of the open/close operation sections 40a and 40b are respectively heat-sealed to the outer surfaces of the flexible resin sheets 20a and 20b. At this heat sealing, the vertical spacings between the upper end portions 42a and 42b and the lower end portions 43a and 43b are set appropriately so that center portions 41a and 41b between the upper end portions 42a and 42b and the lower end portions 43a and 43b be loosened with respect to the flexible resin sheets 20a and 20b. As a result, as shown in FIGS. 1 and 2B, insertion paths 45a and 45b into which a finger can be inserted are formed between the center portions 41a and 41b of the open/close operation sections 40a and 40b and the flexible resin sheets 20a and 20b.

[0036] As shown in FIGS. 2A and 2C, when viewed from the front or the back, the medical flexible container 1 is asymmetric with respect to its center axis 1a. In other words, as shown in FIG. 2A, when the medical flexible container 1 is viewed from the front, the left end of the upper portion of the flexible bag member 20 is cut forming a cut 20c. Also, out of side edges 46a and 46b on both ends of each of the open/close operation sections 40a and 40b in the width direction (i.e., the lateral direction), the side edge 46a closer to the cut 20c is inclined with respect to the center axis 1a, and the other side edge 46b farther from the cut 20c is approximately parallel to the center axis 1a.

[0037] How to use the medical flexible container 1 of this embodiment will be described.

[0038] As shown in FIG. 4, the medical flexible container 1 can constitute a nutrient supply system 90 by connecting an infusion set 91 to the discharge port 30, for example. The infusion set 91 includes: a flexible tube 92 one end of which is

connected to the discharge port 30; a drip chamber 93 and a flow adjuster 94 provided on the flexible tube 92; a connector 95 provided at the other end of the flexible tube 92; a connector cover 96 covering the connector 95, etc. The drip chamber 93 makes the flow of a liquid material flowing through the infusion set 91 visible. The flow adjuster 94 permits adjustment of the flow rate of the liquid material flowing through the infusion set 91 by pressing the flexible tube 92 to change the cross section area of the flow path of the flexible tube 92. The connector 95 is connected to a tube (not shown) inserted into a nasal cavity or vein of a patient. Note however that the nutrient supply system of the present invention is not limited to the configuration shown in FIG. 4, but a nutrient supply system may be constituted by combining any conventional known infusion set with the medical flexible container 1 of this embodiment, for example.

[0039] First, the flow path is closed by pressing the flexible tube 92 by operating the flow adjuster 94. In this state, as shown in FIG. 5, the medical flexible container 1 is held with the left hand by inserting the thumb of the left hand into the insertion path 45a of the open/close operation section 40a and inserting another finger (the forefinger in FIG. 5) of the left hand into the the insertion path 45b of the open/close operation section 40b. The mouth section 22 can be opened or closed freely by moving the thumb and the forefinger inserted in the insertion paths 45a and 45b farther from or closer to each other.

[0040] Thereafter, as shown in FIG. 6, while the medical flexible container 1 is held with the left hand with the mouth section 22 being kept open, a liquid material (e.g., an infusion solution) in a cup 98 held with the right hand (not shown) is poured through the mouth section 22.

[0041] Since the thumb and the forefinger are inserted in the insertion paths 45a and 45b, the medical flexible container 1 can be held stably while the mouth section 22 being kept open widely. This reduces the possibility of dropping the medical flexible container 1, or failing to open the mouth section 22 sufficiently causing spilling of the liquid material. Thus, the mental and physical burdens on the worker who is pouring the liquid material into the medical flexible container 1 are lightened.

[0042] Also, as shown in FIG. 6, when the worker holds the medical flexible container 1 with the left hand facing the front (the surface on which the scale 25 is provided) of

the medical flexible container 1, the palm of the left hand fits to the cut 20c (see FIGS. 2A and 2C). Therefore, even a worker having small hands can insert his or her fingers deep into the insertion paths 45a and 45b.

[0043] When the wrist joint of the left hand is at a natural angle, the front of the medical flexible container 1 faces the worker as shown in FIG. 6, permitting the worker to easily view the scale 25 provided on the front. Also, the scale 25 is not obstructed by the left hand, etc. Since the open/close operation sections 40a and 40b and the scale 25 are provided along the center axis 1a (see FIGS. 2A and 2C), the medical flexible container 1 held with the open/close operation sections 40a and 40b is to be held so that the center axis 1a be approximately parallel to the gravity direction, permitting precise measurement of the poured amount with the scale 25.

[0044] After the pouring of the liquid material, the zip 23 is engaged to close the mouth section 22.

[0045] The medical flexible container 1 filled with the liquid material in the manner described above is hung from a stand, etc. using the hanging hole 27 of the hanging section 26 positioned above the mouth section 22. The medical flexible container 1 is hung so that its center axis 1a be approximately parallel to the gravity direction and the discharge port 30 be at the lowest position. The connector 95 is connected to a tube inserted into a patient, and the flow adjuster 94 is opened, whereby the liquid material in the medical flexible container 1 can be administered to the patient. Since the discharge port 30 is located at the lowest position, the entirety of the liquid material in the medical flexible container 1 will flow out.

[0046] The attachment positions of the open/close operation sections 40a and 40b on the flexible bag member 20 are not especially restricted as far as the medical flexible container 1 can be held with one hand while the mouth section 22 being opened. Generally, it is preferable to attach the open/close operation sections 40a and 40b so that the laterally extending insertion paths 45a and 45b be formed near the top end of the mouth section 22. When the mouth section 22 is provided with the zip 23, the zip 23 may be openable and closable with fingers staying in the insertion paths 45a and 45b. Thus, as in the present embodiment, it is preferable to attach the open/close operation sections 40a and 40b to the mouth section 22 so that the zip 23 be sandwiched vertically by the upper end portions 42a and 42b and the lower end

portions 43a and 43b of the open/close operation sections 40a and 40b.

[0047] FIG. 7A is an enlarged view of portion 7A in FIG. 2A showing the upper end portion 42a of the open/close operation section 40a on the front side and a heat sealing region 52a for heat sealing. FIG. 7B is an enlarged view of portion 7B in FIG. 2C showing the upper end portion 42b of the open/close operation section 40b on the back side and a heat sealing region 52b for heat sealing. The heat sealing regions 52a and 52b surrounded by the solid lines shown in FIGS. 7A and 7B are respectively regions to be heated when the upper end portions 42a and 42b are fused to the flexible resin sheets 20a and 20b by heat sealing. Heat sealing is normally performed by pressing a heated mold against a member to be fused. Therefore, the heat sealing regions 52a and 52b are also mold traces formed by a mold pressed against at the heat sealing.

[0048] The upper end portions 42a and 42b of the open/close operation sections 40a and 40b are respectively secured to the flexible resin sheets 20a and 20b in their overlap areas with the heat sealing regions 52a and 52b.

[0049] The profiles of the heat sealing regions 52a and 52b respectively have approximate arc perimeters 52a1 and 52b1 and lines 52a2 and 52b2 connecting both ends of the approximate arc perimeters 52a1 and 52b1. The approximate arc perimeters 52a1 and 52b1 are located closer to the center portions 41a and 41b of the open/close operation sections 40a and 40b than the lines 52a2 and 52b2.

[0050] In this embodiment, the heat sealing regions 52a and 52b respectively include the entirety of end edges 47a and 47b of the open/close operation sections 40a and 40b on the side away from the center portions 41a and 41b thereof (the first condition). Also, at intersection points P12a and P12b of the outer periphery (the approximate arc perimeter 52a1, 52b1 in this embodiment) of each of the heat sealing regions 52a and 52b and both side edges 46a and 46b of each of the open/close operation sections 40a and 40b in the width direction, the outer periphery (the approximate arc perimeter 52a1, 52b1) of the heat sealing region 52a, 52b is inclined with respect to the length direction of the open/close operation section 40a, 40b (the direction of the center axis 1a in this embodiment) (the second condition).

[0051] FIG. 8A is an enlarged view of portion 8A in FIG. 2A showing the lower end portion 43a of the open/close operation section 40a on the front side and a heat sealing region 53a for heat sealing. FIG. 8B is an enlarged view of portion 8B in FIG. 2C

showing the lower end portion 43b of the open/close operation section 40b on the back side and a heat sealing region 53b for heat sealing. The heat sealing regions 53a and 53b surrounded by the solid lines shown in FIGS. 8A and 8B are respectively regions to be heated when the lower end portions 43a and 43b are fused to the flexible resin sheets 20a and 20b by heat sealing, and also are mold traces formed by a mold pressed against at the heat sealing.

[0052] The lower end portions 43a and 43b of the open/close operation sections 40a and 40b are respectively secured to the flexible resin sheets 20a and 20b in their overlap areas with the heat sealing regions 52a and 52b.

[0053] As in the heat sealing regions 52a and 52b shown in FIGS. 7A and 7B, the profiles of the heat sealing regions 53a and 53b respectively have approximate arc perimeters 53a1 and 53b1 and lines 53a2 and 53b2 connecting both ends of the approximate arc perimeters 53a1 and 53b1. The approximate arc perimeters 53a1 and 53b1 are located closer to the center portions 41a and 41b of the open/close operation sections 40a and 40b than the lines 53a2 and 53b2.

[0054] In this embodiment, the heat sealing regions 53a and 53b respectively include the entirety of end edges 48a and 48b of the open/close operation sections 40a and 40b on the side away from the center portions 41a and 41b thereof (the first condition). Also, at intersection points P13a and P13b of the outer periphery (the approximate arc perimeter 53a1, 53b1 in this embodiment) of each of the heat sealing regions 53a and 53b and both side edges 46a and 46b of each of the open/close operation sections 40a and 40b in the width direction, the outer periphery (the approximate arc perimeter 52a1, 52b1) of the heat sealing region 52a, 52b is inclined with respect to the length direction of the open/close operation section 40a, 40b (the direction of the center axis 1a in this embodiment) (the second condition).

[0055] Effects obtained from the heat sealing of the upper and lower end portions 42a, 42b, 43a, and 43b of the open/close operation sections 40a and 40b in the heat sealing regions 52a, 52b, 53a, and 53b as described above will be discussed as follows.

[0056] For comparison, examples where the upper end portion 42a of the open/close operation section 40a is secured to the flexible resin sheet 20a by heat sealing at a heat sealing region different from that according to the present invention are shown in FIGS. 9A and 9B.

[0057] A heat sealing region 102a shown in FIG. 9A has a shape of an approximate rectangle placed inside the end edge 48a and side edges 46a and 46b of the upper end portion 42a of the open/close operation section 40a. Therefore, unlike the heat sealing regions in this embodiment, the heat sealing region 102a does not include the end edge 48a of the open/close operation section 40a on the side away from the center portion 41a thereof (i.e., the first condition is not satisfied). Moreover, the outer periphery of the heat sealing region 102a does not intersect with the side edges 46a and 46b of the open/close operation section 40a in the width direction (i.e., the second condition is not satisfied).

[0058] A heat sealing region 112a shown in FIG. 9B has a shape of an approximate rectangle extending beyond the upper end portion 42a of the open/close operation section 40a. Therefore, like the heat sealing regions in this embodiment, the heat sealing region 112a includes the end edge 48a of the open/close operation section 40a on the side away from the center portion 41a thereof (the first condition). However, unlike the heat sealing regions in this embodiment, at intersection points P12a and P12b of the outer periphery of the heat sealing region 112a and both the side edges 46a and 46b of the open/close operation section 40a in the width direction, the outer periphery of the heat sealing region 112a is vertical to the length direction of the open/close operation section 40a (i.e., the second condition is not satisfied).

[0059] If the heat sealing region does not include the end edge 48a of the open/close operation section 40a on the side away from the center portion 41a thereof, like the heat sealing region 102a shown in FIG. 9A, the end edge 48a of the open/close operation section 40a does not adhere tightly to the flexible resin sheet 20a but rises from the flexible resin sheet 20a. This causes problems that the worker's skin may be caught on the end edge 48a degrading the touch of the medical flexible container and that such an end edge 48a gives a bad appearance and cheap impression degrading the quality of the medical flexible container. By contrast, according to the present invention, as shown in FIG. 7A, the heat sealing region 52a includes the entirety of the end edge 47a of the open/close operation section 40a on the side away from the center portion 41a thereof (the first condition). Therefore, with the end edge 48a adhering tightly to the flexible resin sheet 20a, the above problems can be solved.

[0060] Also, since the heat sealing region 52a includes the entirety of the end edge

47a of the open/close operation section 40a (the first condition), the overlap area of the heat sealing region 52a and the upper end portion 42a of the open/close operation section 40a, which is the area of the upper end portion 42a heat-sealed to the flexible resin sheet 20a, is large. Therefore, the required strength of attachment of the open/close operation section 40a to the flexible resin sheet 20a can be easily secured.

[0061] If the outer periphery of the heat sealing region is not inclined with respect to the length direction of the open/close operation section 40a at the intersection points P12a and P12b, like the heat sealing region 112a shown in FIG. 9B, the following problem will arise. That is, when the mouth section 22 is opened with a finger being inserted into the insertion path 45a of the open/close operation section 40a and when a liquid material is poured into the medical flexible container 1 while the finger being kept in the insertion path 45a as shown in FIGS. 5 and 6, an external force acting toward stripping off the center portion 41a of the open/close operation section 40a from the flexible resin sheet 20a is exerted on the center portion 41a. This external force often acts obliquely with respect to the length direction of the open/close operation section 40a when viewed from the direction vertical to the flexible resin sheet 20a. If the outer periphery of the heat sealing region 112a is vertical to the length direction of the open/close operation section 40a at the intersection points P12a and P12b as shown in FIG. 9B, the oblique external force will act locally on the intersection points P12a and P12b, resulting in stress concentration on the intersection points P12a and P12b. At worst, the flexible resin sheet 20a may rip at the intersection points P12a and P12b. By contrast, according to the present invention, as shown in FIG. 7A, the outer periphery of the heat sealing region 52a is inclined with respect to the length direction of the open/close operation section 40a at the intersection points P12a and P12b (the second condition). Therefore, the oblique external force spreads over and is exerted on areas A1 and A2 along the outer periphery of the heat sealing region 52a including the intersection points P12a and P12b. Thus, with no occurrence of such large stress concentration as that in the case of FIG. 9B, the trouble of ripping of the flexible resin sheet 20a can be prevented.

[0062] Although the effects of the heat sealing regions were described above taking the heat sealing region 52a for the upper end portion 42a of the open/close operation section 40a shown in FIG. 7A as an example, these also apply to the other heat sealing

regions 52b, 53a, and 53b.

[0063] In this embodiment, all the upper and lower end portions 42a, 42b, 43a, and 43b of the open/close operation sections 40a and 40b are secured to the flexible bag member 20 by heat sealing involving the heat sealing regions 52a, 52b, 53a, and 53b (see FIGS. 7A, 7B, 8A, and 8B) satisfying the first and second conditions. However, the present invention is not limited to this. That is, according to the present invention, it is only necessary to secure at least one of the end portions 42a, 42b, 43a, and 43b by heat sealing at the heat sealing region satisfying the first and second conditions. Preferably, the upper end portion 42a and/or the upper end portion 42b should be secured by heat sealing at the heat sealing region satisfying the first and second conditions. This is because the upper end portions 42a and 42b are susceptible to the weight of the liquid material poured in the medical flexible container 1 and also to occurrence of the stress concentration discussed with reference to FIG. 9B.

[0064] In this embodiment, the approximate arc perimeters 52a1, 52b1, 53a1, and 53b1 respectively constituting the heat sealing regions 52a, 52b, 53a, and 53b are not necessarily arc perimeters as strictly defined having a fixed curvature. They may just be curves protruding toward the center portions 41a and 41b of the open/close operation sections 40a and 40b, and the curvatures of the curves may vary. For example, they may be part of ellipses, for example.

[0065] Also, the lines 52a2, 52b2, 53a2, and 53b2 respectively constituting the heat sealing regions 52a, 52b, 53a, and 53b are not necessarily straight lines as strictly defined, but may include curved or bent portions.

[0066] The materials of the flexible resin sheets 20a and 20b constituting the flexible bag member 20 and the open/close operation sections 40a and 40b are not specifically limited, but conventionally known flexible resin sheets used for medical flexible containers, for example, may be used. Specific examples of such sheets include single-layer sheets made of vinyl chloride resin, polyethylene, ethylene-vinyl acetate copolymer, polyester, polybutadiene, polypropylene, polyamide, ethylene-methacrylate copolymer, etc. or laminate sheets of two or more of the above single-layer sheets. Examples of specific configurations of the laminate sheets include nylon/polyethylene, nylon/polypropylene, polyethylene terephthalate/polyethylene, polyethylene

terephthalate/polypropylene, polypropylene/polyethylene, nylon/polypropylene/polyethylene, etc. Alternatively, a laminate sheet of resins of the same kind different in grade (e.g., film formation method, mechanical properties, composition, etc.), such as biaxially-oriented polypropylene (OPP)/cast polypropylene (CPP), etc., may be used. The same material or different materials may be used for the flexible resin sheets 20a and 20b and the open/close operation sections 40a and 40b. It is preferable that the surface subjected to heat sealing be made of a material that can be easily heat-sealed (e.g., polypropylene). The thickness of the flexible resin sheets 20a and 20b is not specifically limited, but may be about 0.1 to 0.6 mm, for example. It is preferable that the flexible resin sheets 20a and 20b have transparency (or translucency) because this allows the liquid material in the storage section 21 to be visible from outside. More preferably, the flexible resin sheets 20a and 20b are transparent.

[0067] The material of the discharge port 30 is not specifically limited, but a material more rigid than the material of the flexible resin sheets 20a and 20b is preferred. Specific examples of such a material include cyclic polyolefin, polycarbonate, polyethylene terephthalate, polypropylene, polyethylene naphthalate, etc.

[0068] (Embodiment 2)

Embodiment 2 is different from Embodiment 1 in the shape of the heat sealing regions for the upper and lower end portions 42a, 42b, 43a, and 43b of the open/close operation sections 40a and 40b. Embodiment 2 will be described hereinafter focusing on the points different from Embodiment 1.

[0069] FIG. 10A is an enlarged view of the upper end portion 42a of the open/close operation section 40a on the front side and a heat sealing region 62a for heat sealing in Embodiment 2. FIG. 10B is an enlarged view of the lower end portion 43a of the open/close operation section 40a on the front side and a heat sealing region 63a for heat sealing in Embodiment 2. The upper end portion 42a and the lower end portion 43a of the open/close operation section 40a are secured to the flexible resin sheet 20a in their overlap areas with the heat sealing regions 62a and 63a.

[0070] Although illustration is omitted, the heat sealing regions for the upper end portion 42b and the lower end portion 43b of the open/close operation section 40b on the back side are plane-symmetric to the heat sealing regions 62a and 63a.

Therefore, the following description on the heat sealing regions 62a and 63a for the upper end portion 42a and the lower end portion 43a of the open/close operation section 40a also applies to the heat sealing regions for the upper end portion 42b and the lower end portion 43b of the open/close operation section 40b on the back side.

[0071] The heat sealing regions 62a and 63a in this embodiment both have a shape of an approximate trapezoid. A shorter side 62a2, 63a2, out of the two approximately parallel sides constituting the approximate trapezoid, is closer to the center portion 41a of the open/close operation section 40a than a longer side 62a1, 63a1.

[0072] In this embodiment, the heat sealing regions 62a and 63a respectively include the entirety of the end edges 47a and 48a of the open/close operation section 40a on the side away from the center portion 41a thereof (the first condition). Also, at the intersection points P12a, P12b, P13a, and P13b of the outer peripheries of the heat sealing regions 62a and 63a (oblique sides 62a3, 62a4, 63a3, and 63a4 of the approximate trapezoids in this embodiment) and the both side edges 46a and 46b of the open/close operation section 40a in the width direction, the outer peripheries (oblique sides 62a3, 62a4, 63a3, and 63a4) of the heat sealing regions 62a and 63a are inclined with respect to the length direction of the open/close operation section 40a, 40b (the direction of the center axis 1a in this embodiment) (the second condition).

[0073] The heat sealing regions 62a and 63a in this embodiment satisfy the first and second conditions, and thus have effects similar to those of the heat sealing regions 52a, 52b, 53a, and 53b in Embodiment 1.

[0074] Specifically, since the heat sealing regions 62a and 63a include the entirety of the end edges 47a and 48a on the side away from the center portion 41a of the open/close operation section 40a (the first condition), the end edges 47a and 48a adhere tightly to the flexible resin sheet 20a. Thus, there is no degradation in touch and appearance, and thus quality degradation can be prevented.

[0075] Also, since the heat sealing regions 62a and 63a include the entirety of the end edges 47a and 48a of the open/close operation section 40a (the first condition), the areas of the upper end portion 42a and the lower end portion 43a of the open/close operation section 40a heat-sealed to the flexible resin sheet 20a are large. Therefore, the required strength of attachment of the open/close operation section 40a to the flexible resin sheet 20a can be easily secured.

[0076] In addition, at the intersection points P12a and P12b, the outer peripheries (i.e., the oblique sides 62a3, 62a4, 63a3, and 63a4) of the heat sealing regions 62a and 63a are inclined with respect to the length direction of the open/close operation section 40a, 40b (the second condition). Therefore, even if an external force acting toward stripping off the center portion 41a of the open/close operation section 40a from the flexible resin sheet 20a is exerted on the center portion 41a, no large stress concentration will occur, and thus the trouble of ripping of the flexible resin sheet 20a can be prevented.

[0077] The other part of Embodiment 2 is the same as that of Embodiment 1.

[0078] (Embodiment 3)

Embodiment 3 is different from Embodiment 1 in the attachment of the upper end portions 42a and 42b of the open/close operation sections 40a and 40b to the flexible resin sheets 20a and 20b. Embodiment 3 will be described hereinafter focusing on the point different from Embodiment 1.

[0079] FIG. 11 is a perspective view of a medical flexible container 3 of Embodiment 3, FIG. 12A is a front view thereof, and FIG. 12B is a right side view thereof.

[0080] In Embodiment 1, the surface of the upper end portion 42a, 42b heat-sealed to the flexible resin sheet 20a, 20b and the surface of the lower end portion 43a, 43b heat-sealed to the flexible resin sheet 20a, 20b are on the same side of the open/close operation section 40a, 40b. By contrast, in this embodiment, the surface of the upper end portion 42a, 42b heat-sealed to the flexible resin sheet 20a, 20b and the surface of the lower end portion 43a, 43b heat-sealed to the flexible resin sheet 20a, 20b are on the opposite sides of the open/close operation section 40a, 40b.

[0081] The method of heat sealing the lower end portions 43a and 43b of the open/close operation sections 40a and 40b to the flexible resin sheets 20a and 20b is the same as that in Embodiment 1 (see FIGS. 8A and 8B).

[0082] FIG. 13 is an enlarged view showing the upper end portion 42a of the open/close operation section 40a on the front side and the heat sealing region 52a for heat sealing in Embodiment 3.

[0083] Although illustration is omitted, the upper end portion 42b of the open/close operation section 40b and the heat sealing region for this portion on the back side are plane-symmetric to the upper end portion 42a and the heat sealing region 52a on the

front side. Therefore, the following description on the heat sealing region 52a for the upper end portion 42a of the open/close operation section 40a also applies to the heat sealing region for the upper end portion 42b of the open/close operation section 40b on the back side.

[0084] The profile of the heat sealing region 52a has an approximate arc perimeter 52a1 and a line 52a2 connecting both ends of the approximate arc perimeter 52a1, as in FIG. 7A. The approximate arc perimeter 52a1 is located closer to the center portion 41a of the open/close operation section 40a than the line 52a2. The upper end portion 42a of the open/close operation section 40a is secured to the flexible resin sheet 20a in its overlap area with the heat sealing region 52a.

[0085] In this embodiment, as in Embodiment 1, the heat sealing region 52a includes the entirety of the end edge 47a of the open/close operation section 40a on the side away from the center portion 41a thereof (the first condition). Also, at the intersection points P12a and P12b of the outer periphery (the approximate arc perimeter 52a1 in this embodiment) of the heat sealing region 52a and the both side edges 46a and 46b of the open/close operation section 40a in the width direction, the outer periphery (approximate arc perimeter 52a1) of the heat sealing region 52a is inclined with respect to the length direction of the open/close operation section 40a, 40b (the direction of the center axis 1a in this embodiment) (the second condition).

[0086] As described above, in this embodiment, the orientation of the attachment of the upper end portions 42a and 42b of the open/close operation sections 40a and 40b to the flexible resin sheets 20a and 20b and the orientation of the heat sealing regions 52a and 52b are upside down relative to those in Embodiment 1. In this embodiment, also, the heat sealing regions for the upper end portions 42a and 42b satisfy the first and second conditions. Thus, this embodiment has the same effects as Embodiment 1.

[0087] In this embodiment, the heat sealing regions may have a shape of an approximate trapezoid described in Embodiment 2.

[0088] In this embodiment, the open/close operation sections 40a and 40b are subjected to heat sealing to the flexible resin sheets 20a and 20b on both surfaces. Therefore, it is preferable that both surfaces of each of the open/close operation sections 40a and 40b be made of a material that can be easily heat-sealed (e.g., polypropylene).

[0089] The other part of Embodiment 3 is the same as those of Embodiments 1 and 2.

[0090] (Embodiment 4)

In Embodiments 1 to 3, the open/close operation sections 40a and 40b were members separate from the flexible resin sheets 20a and 20b (see FIG. 3). In Embodiment 4, the open/close operation sections 40a and 40b are formed integrally with the flexible resin sheets 20a and 20b. Embodiment 4 will be described hereinafter focusing on the points different from Embodiment 1.

[0091] FIG. 14 is a perspective view of a medical flexible container 4 of Embodiment 4, FIG. 15A is a front view thereof, and FIG. 15B is a right side view thereof. FIG. 16 is an exploded perspective view of the medical flexible container 4.

[0092] As shown in FIG. 16, the open/close operation sections 40a and 40b are respectively formed on the upper ends of the flexible resin sheets 20a and 20b integrally. The open/close operation sections 40a and 40b are bent downward, and the top ends thereof are secured to the outer surfaces of the flexible resin sheets 20a and 20b by heat sealing, respectively. The top ends of the open/close operation sections 40a and 40b secured to the flexible resin sheets 20a and 20b serve as the lower end portions 43a and 43b (see FIGS. 14, 15A, and 15B). The heat sealing regions 53a and 53b for the lower end portions 43a and 43b for heat sealing are the same as those in Embodiment 1 (see FIGS. 8A and 8B).

[0093] In Embodiment 4, the lower end portions 43a and 43b of the open/close operation sections 40a and 40b are secured to the flexible resin sheets 20a and 20b by heat sealing in the same heat sealing regions 53a and 53b as those in Embodiment 1. The heat sealing regions 53a and 53b satisfy the first and second conditions. Thus, this embodiment has the same effects as Embodiment 1.

[0094] Also, in this embodiment, the end portions (upper end portions) opposite to the lower end portions 43a and 43b of the open/close operation sections 40a and 40b are continuous from and integral with the flexible resin sheets 20a and 20b. This improves the connection strength of the end portions to the flexible resin sheets 20a and 20b. Also, the touch and the appearance are good. Moreover, since the number of components constituting the medical flexible container 4 is reduced, cost reduction can be achieved.

[0095] In this embodiment, also, the heat sealing regions of the lower end portions

43a and 43b may have a shape of an approximate trapezoid described in Embodiment 2.

[0096] The medical flexible container 4 of this embodiment does not include the hanging section 26 having the hanging hole 27 provided in the medical flexible container 1 of Embodiment 1. The hanging hole 27 for hanging the medical flexible container 4 may be directly formed through the flexible resin sheets 20a and 20b. Alternatively, a hanging section having a hanging hole may be formed as a separate member and secured to the flexible resin sheet by heat sealing, etc. Otherwise, a hanging section having a hanging hole may be formed integrally with the flexible resin sheet individually from the open/close operation sections 40a and 40b.

[0097] Although both the open/close operation sections 40a and 40b are respectively formed integrally with the flexible resin sheets 20a and 20b in this embodiment, the present invention is not limited to this. For example, while the open/close operation section 40a is formed integrally with the flexible resin sheet 20a as in Embodiment 4, the open/close operation section 40b may be formed as a separate member from the flexible resin sheet 20b, and the upper and lower end portions thereof may be secured to the flexible resin sheet 20b by heat sealing, as in Embodiments 1 to 3.

[0098] Embodiments 1 to 4 described above are for illustrative purposes only, and the present invention is not limited to these embodiments but can be modified appropriately.

[0099] For example, although the end edges 47a, 47b, 48a, and 48b of the open/close operation sections 40a and 40b were straight lines extending perpendicular to the length direction of the open/close operation sections in the above embodiments, the end edges according to the present invention are not limited to this. For example, they may be curved or bent.

[0100] Although the side edges 46a of the open/close operation sections 40a and 40b were inclined with respect to the center axis 1a while the side edges 46b are approximately parallel to the center axis 1a in the above embodiments, the directions of the side edges 46a and 46b can be set arbitrarily. The side edges 46a and 46b may be curved or bent.

[0101] Although the open/close operation sections 40a and 40b had an approximately tapered shape where the upper end portions 42a and 42b were wide and the lower end

portions 43a and 43b were narrow in the above embodiments, the shape of the open/close operation sections 40a and 40b according to the present invention is not limited to this, but may be an arbitrary one.

[0102] The shape of the flexible bag member 20 is not particularly limited, but any arbitrary shape such as a rectangle and an ellipse may be used. It is however preferable that the lower end of the storage section 21 be mildly tilted toward the discharge port 30 to permit the entirety of the liquid material, etc. inside the flexible bag member 20 to flow out through the discharge port 30.

[0103] Although the cut 20c was formed on the flexible bag member 20 to allow even a person having a small hand to insert his or her fingers into the insertion paths 45a and 45b in the above embodiments, the cut 20c may be omitted. Alternatively, the cut 20c may be formed on the right side, not on the left side, of the flexible bag member 20. Otherwise, the cut 20c may be formed on both the right and left sides.

[0104] The scale 25 may be formed on the flexible resin sheet 20b, not on the flexible resin sheet 20a. Alternatively, the scale 25 may be formed on both the flexible resin sheets 20a and 20b, or otherwise may be omitted.

[0105] Although the scale 25 was formed along the center axis 1a in the above embodiments, the present invention is not limited to this. For example, the scale 25 may be formed along a straight line parallel to the center axis 1a running near one of the two edges of the flexible bag member 20 in the width direction. When being formed on both the flexible resin sheets 20a and 20b, such scales 25 on the sheets 20a and 20b may be formed at positions facing each other or at positions not facing each other.

[0106] In the above embodiments, the zip 23 was provided in the mouth section 22 so that the mouth section 22 can be reversibly opened and closed. Alternatively, any structure, other than the zip 23, that can reversibly open and close the mouth section 22 may be provided. Otherwise, the zip 23 may be omitted.

[0107] The mouth section 22 may be provided with an irreversible structure that cannot be closed once it has been opened.

[0108] Although the flexible bag member 20 was constituted by two flexible resin sheets 20a and 20b in the above embodiments, three or more flexible resin sheets may constitute the flexible bag member 20. For example, a flexible resin sheet serving as

a gusset may be interposed between the flexible resin sheets 20a and 20b for increasing the capacity of the storage section 21 or allowing the mouth section 22 to open widely.

[0109] The shape of the discharge port 30 is not specifically limited. For example, it may be an arbitrary shape fitting to a connector provided at the upstream end of the infusion set. To ensure the connection between the discharge port 30 and the connector, the discharge port 30 may be provided with an engaging structure that engages with the connector.

[0110] While the embodiments have been described for the purpose of clarifying the technical details of the present invention, the invention should not be construed as being limited to these specific examples. Since the invention can be modified in various ways and carried out without departing from the spirit of the invention within the scope of the appended claims, it should be construed broadly.

Industrial Applicability

[0111] The present invention can be used in various fields without particular limitations, and can be used widely as medical containers for storing liquid materials. Among others, the present invention can be used advantageously as containers used for the enteral nutrition therapy and the intravenous nutrition therapy.

List of Reference Numerals

[0112]

1, 3, 4	Medical flexible container
20	Flexible bag member
20a, 20b	Flexible resin sheet
21	Storage section
22	Mouth section
30	Discharge port
40a, 40b	Open/close operation section
41a, 41b	Center portion of open/close operation section
42a, 42b	Upper end portion of open/close operation section
43a, 43b	Lower end portion of open/close operation section
45a, 45b	Insertion path

46a, 46b Side edge of open/close operation section

47a, 47b, 48a, 48b End edge of open/close operation section

52a, 52b, 53a, 53b, 62a, 63a Heat sealing region

52a1, 52b1, 53a1, 53b1 Approximate arc perimeter of heat sealing region

52a2, 52b2, 53a2, 53b2 Line of heat sealing region

62a1, 63a1 Longer side of approximately trapezoidal heat sealing region

62a2, 63a2 Shorter side of approximately trapezoidal heat sealing region

90 Nutrient supply system

91 Infusion set

P12a, P12b, P13a, P13b Intersection point

CLAIMS

[1] A medical flexible container comprising:

a flexible bag member including at least two flexible resin sheets attached to each other and provided with an openable/closable mouth section at its top end;

a discharge port provided at a bottom end of the flexible bag member; and

a pair of open/close operation sections provided on the flexible bag member, center portions of the pair of open/close operation sections being loosened to form insertion paths through which a finger can be inserted,

wherein at least one of an upper end portion and a lower end portion of at least one of the pair of open/close operation sections is secured to an outer surface of the flexible bag member by heat sealing, and

a heat sealing region formed when the at least one end portion is secured by heat sealing includes the entirety of an end edge of the at least one end portion, and at intersection points of an outer periphery of the heat sealing region and both side edges of the open/close operation section, the outer periphery is inclined with respect to the length direction of the open/close operation section.

[2] The medical flexible container of claim 1, wherein

the heat sealing region has an approximate arc perimeter and a line connecting both ends of the approximate arc perimeter, and the approximate arc perimeter intersects with the side edges of the open/close operation section.

[3] The medical flexible container of claim 1, wherein

the heat sealing region has a shape of an approximate trapezoid, and oblique sides of the approximate trapezoid intersect with the side edges of the open/close operation section.

[4] The medical flexible container of any of claims 1 to 3, wherein

the pair of open/close operation sections are produced as separate members from the flexible resin sheets constituting the flexible bag member, and the upper and lower end portions of the pair of open/close operation sections are secured to outer

surfaces of the flexible bag member by heat sealing.

[5] The medical flexible container of any of claims 1 to 3, wherein

the upper end portions of the pair of open/close operation sections are secured to outer surfaces of the flexible bag member at the heat sealing regions by heat sealing.

[6] The medical flexible container of any of claims 1 to 3, wherein

the pair of open/close operation sections are produced integrally with the flexible resin sheets constituting the flexible bag member, and the lower end portions of the pair of open/close operation sections are secured to outer surfaces of the flexible bag member by heat sealing.

[7] A nutrient supply system comprising the medical flexible container of claim 1.