

CONTAINER FOR CENTRIFUGAL SEPERATION PROVIDING RAPID CENTRIFUGAL SEPERATION

TECHNICAL FIELD

The present invention relates to a container for fast centrifugation which
5 is installed in a centrifugal separator, and in particular to a container for fast
centrifugation which makes it possible to fast separate and obtain a
predetermined component layer in such a way that a valve assembly arranged
to define a boundary layer between a centrifugally separated sediment
substance and a floating substance may be configured reciprocate during a
10 centrifugation procedure but be configured not to rotate, and a passage through
which a floating substance separated from a sediment substance moves is
configured to be wider, wherein a centrifugation is performed based on a
difference in components-based viscosities by applying a centrifugal force to a
biologically combined fluid such as blood or bone marrow.

15 BACKGROUND ART

A centrifugal separator is a device configured to separate substances
using a centrifugal force which generates when a predetermined thing rotates.
In biotechnology, such a centrifugal separator is used so as to separate a
predetermined substance having a viscosity and an adhering force both higher
20 than a cell mixed in a liquid or a liquid itself on the basis of viscosity. When a
combined fluid such as blood is centrifugally separated using a centrifugal

separator, the fluid is separated into multiple layers based on their viscosities.

Blood may be used as an important index so as to determine various diseases or health states. Platelet in blood has a plenty of growth factors, so it may be used for the purpose of medical treatment. Blood contains red blood cell, while blood cell, and platelet of which the platelet is generally contained in plasma. The plasma may consist of a platelet rich plasma (PRP) layer and a platelet poor plasma (PPP) layer. When the PRP is implanted in a painful portion, more specifically, in knee, ligament, muscle, etc., the PRP may help cells grow by stimulating stem cells around the implanted portion, which means that the PRP may be used for the purpose of medical treatment. However, the PRP exists by a small amount, and it is hard to separate the PRP because the PRP is adhered to the red blood cells. When the red blood cells go into a human body, severe pain occurs along with inflammation. A centrifugal separator may be used when it needs to separate plasma from red blood cells and to collect the PRP from the separated plasma.

The centrifugal separator may be classified into a variety of types based on the amount of sample materials, its rotation speed and the type of rotor. The centrifugal separator includes a plurality of chambers which are configured to accommodate substances to be centrifugally separated and which are also configured to separate the substance into multiple layers based on the viscosities which occur due to centrifugal force and are configured to decant

part of the separated layer wherein the decanting procedure is performed while pouring the floating substances into another chamber.

As a related art on the centrifugal separator, the Korean Registered Patent No. 10-0435264 includes a plurality of chambers which are configured to
5 accommodate substances to be centrifugally separated, a means which is configured to rotate the chambers, and a means which is configured to fix the chambers at predetermined portions so that the floating substances in a first chamber of the chambers may be discharged into a second chamber. In the interior of the first chamber, there is provided a disk which floats on a boundary
10 layer defined between substances. A groove is formed at one side of the disk so as to allow the centrifugally separated floating substance to pass toward the other side of the disk.

According to the above-described constructions, it is possible to separate and discharge the floating substances between two or more than two
15 chambers of the container by fixing a sample container in a predetermined direction in the course of centrifugation or after the centrifugation; however in the above mentioned disk, a hollow tube is inserted in the center of the disk, and a groove is formed at one side of the disk for fluid communication, so the disk may rotate or rattle when it starts moving in a longitudinal direction of the
20 first chamber in reaction to a change in a boundary layer of substances which are centrifugally separated during centrifugation, whereby the centrifugally

separated substances may not smoothly pass due to interferences with the groove formed in the disk, which results in increased time during centrifugation.

According to the related art, the first chamber and the second chamber are arranged side by side in parallel with each other, and a fluid communication
5 between the chambers is performed only through a bridge formed in a lid, so the cross section of a passage through which a centrifugally separated substance moves to another chamber is narrow, which results in increased time during decanting work.

SUMMARY OF THE DISCLOSURE

10 Accordingly, the present invention has been made in an effort to resolve the earlier described problems. It is an object of the present invention to provide a container for fast centrifugation which makes it possible to fast and accurately separate a predetermined component substance when separating a component substance using a centrifugal force occurring during the rotations of a
15 centrifugal separator and a difference in components-based viscosities wherein the component substance is identified as a biologically combined fluid such as blood and bone marrow.

It is another object of the present invention to provide a container for centrifugation which makes it possible to easily and fast performing a decanting
20 work in such a way that the purity of a floating substance may be maintained during a decanting procedure by preventing a sediment substance from being

mixed with a floating substance when decanting a centrifugally separated floating substance into another chamber, and the cross section of a passage through which a floating substance moves between the chambers is configured to be wider.

5 To achieve the above objects, there is provided a container for fast centrifugation, comprising a body 100 which includes a first chamber 110 configured to accommodate a centrifugation substance, and a second chamber 120 configured to accommodate the floating substance centrifugally separated from the substance of the first chamber 110 and decanted from the first
10 chamber 110 and which is positioned over an outer surrounding of the first chamber 110; and a cover 200 which is configured to cover top of the body 100 and defines a fluid communication passage "P" for a decanting substance between the first chamber 110 and the second chamber 120, wherein in the interior of the first chamber 110, there is provided a valve assembly 140 which
15 is arranged to reciprocate in a longitudinal direction of the first chamber 110 so that it may be positioned on a boundary layer between the centrifugally separated substances and which includes a plurality of through holes 141 in the bottom surface, and wherein during the centrifugation, the centrifugally separated floating substances move through the plurality of the through holes
20 141 and at the same time move through the gap formed between an outer side surface of the valve assembly 140 and an inner side surface of the first

chamber 110.

In an inner side surface of the first chamber 110 and in an outer side surface of the valve assembly 140, there are provided a plurality of guide ribs 114 and a plurality of guide grooves 142 which are match-formed parallel to one another in a longitudinal direction of the first chamber 110 at regular intervals about the central axis of the first chamber 110, by means of which during centrifugation procedure, the reciprocation movement of the valve assembly 140 is allowed, but rotational movement is blocked.

Also, the valve assembly 140 is formed in a cup shape whose top is open and whose bottom surface and side surface are connected, and the through holes 141 formed in the bottom surface of the valve assembly 140 are formed in the central portion of the bottom surface of the valve assembly 140 and are formed at regular intervals in concentric shapes in a circumferential direction.

Also, the gap formed between the valve assembly 140 and the first chamber 110 and the through holes 141 are sized to allow the floating substances separated from the centrifugation substances during centrifugation to pass, but not to allow the sediments separated from the centrifugation substance to pass.

Also, in the body 100, there is provided a guide unit 115 which is in communication with the fluid communication passage "P" and is configured to

surround an outer side surface of the first chamber 110 so as to guide the decanted floating substances toward the second chamber 120 and is sloped toward the second chamber 120.

Also, on top of the outer wall 111 of the first chamber 110, there is provided a connection unit 112 so as to define the fluid communication passage "P", and in the cover 200, there are provided a protrusion unit 210 configured to cover an upper surrounding of the connection unit 112 with a predetermined space between them, and a concave unit 220 which is formed in an outward direction of the protrusion unit 210, and the fluid communication passage "P" is formed over an upper surrounding of the first chamber 110 by means of a space between the connection unit 112 and a stepped portion 211 formed on a boundary between the protrusion unit 210 and the concave unit 220.

Also, in the bottom surface of the guide unit 115, there are provided an upper sloped surface 115a which is spaced apart from the concave portion 220 of the cover 200 in a direction of one side of the first chamber 110 which is opposite to where the second chamber 120 is positioned, and a sloped surface 115b which extends from the upper sloped surface 115a in both sides along a circumferential surrounding of the first chamber 110 and is connected to the second chamber 120.

Also, the sloped surface 115b is formed in a helical shape, and is formed in a symmetrical shape around the first chamber 110 about the sloped

surface 115a.

Also, the second chamber 120 has a cross section which gradually becomes narrowed from its top to bottom.

ADVANTAGEOUS EFFECTS

5 According to the container for fast centrifugation of the present invention, it is possible to decrease time for centrifugation by fast separating a floating substance from a sediment substance during centrifugation in such a way that a plurality of through holes are formed in a bottom surface of a valve assembly positioned on a boundary layer defined between substances which are
10 centrifugally separated, and a guide rib and a guide groove are formed in an outer side surface of a valve assembly and in an inner side surface of a first chamber so that the valve assembly may reciprocate linearly in a state that a rotational movement is prevented in the interior of the first chamber.

 The through hole formed in a bottom surface of the valve assembly and
15 the gap defined between an outer side surface of the valve assembly and an inner side surface of the first chamber are both sized to allow the floating substances to pass, but not to allow the sediments to pass, so it is possible to prevent the sediment substances from being mixed with the floating substances when decanting the centrifugally separated floating substances toward the
20 second chamber for thereby obtaining a predetermined purity of floating substance.

Also, so as to smoothly guide a floating substance toward a second chamber, a fluid communication passage is provided between a first chamber configured to accommodate substances which will be centrifugally separated and a second chamber configured to accommodate the centrifugally separated floating substance which is separated from the sediment substance, and a guide unit is provided along the surroundings of the first chamber for thereby easily and fast decanting the centrifugally separated substances toward the second chamber and collecting the substances.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will become better understood with reference to the accompanying drawings which are given only by way of illustration and thus are not limitative of the present invention, wherein;

Fig. 1 is a perspective view illustrating a container for fast centrifugation according to an exemplary embodiment of the present invention;

Fig. 2 is a cross sectional view taken along line A-A of Fig. 1;

Fig. 3 is a disassembled perspective view illustrating a container for fast centrifugation according to an exemplary embodiment of the present invention;

Fig. 4 is a front view illustrating a container for fast centrifugation according to an exemplary embodiment of the present invention;

Fig. 5 is a side view illustrating a container for fast centrifugation according to an exemplary embodiment of the present invention;

Fig. 6 is a rear view illustrating a container for fast centrifugation

according to an exemplary embodiment of the present invention;

Fig. 7 is a plane view illustrating a body of a container for fast centrifugation according to an exemplary embodiment of the present invention;

Fig. 8 is a disassembled perspective view illustrating a body and a valve assembly of a container for fast centrifugation according to another exemplary embodiment of the present invention; and

Figs. 9 to 12 are state views illustrating a centrifugation and a decanting procedure of blood using a container for fast centrifugation according to the present invention.

10 DETAILED DESCRIPTION OF THE DISCLOSURE

The constructions and operations of an exemplary embodiment of the present invention will be described with reference to the accompanying drawings.

Fig. 1 is a perspective view illustrating a container for fast centrifugation according to an exemplary embodiment of the present invention, Fig. 2 is a cross sectional view taken along line A-A of Fig. 1, Fig. 3 is a disassembled perspective view illustrating a container for fast centrifugation according to an exemplary embodiment of the present invention, Fig. 4 is a front view illustrating a container for fast centrifugation according to an exemplary embodiment of the present invention, Fig. 5 is a side view illustrating a container for fast centrifugation according to an exemplary embodiment of the present invention,

Fig. 6 is a rear view illustrating a container for fast centrifugation according to an exemplary embodiment of the present invention, Fig. 7 is a plane view illustrating a body of a container for fast centrifugation according to an exemplary embodiment of the present invention, and Fig. 8 is a disassembled perspective view illustrating a body and a valve assembly of a container for fast centrifugation according to another exemplary embodiment of the present invention.

The container for fast centrifugation 10 according to the present invention is installed in the interior of a centrifugal separator so as to separate and collect a predetermined component from a combined fluid when red blood cells and plasma are separated from blood or stem cells are separated from bone marrow. The container for centrifugation 10 includes a body 100 which has a first chamber 110 configured to accommodate a centrifugal separation substance such as blood, bone marrow, etc., and a second chamber 120 in which a floating substance centrifugally separated from a combined fluid injected in the first chamber 110 is decanted and accommodated, and a cover 200 which is configured to cover top of the body 100 and which forms a fluid communication passage "P" of a floating substance which is decanted from the first chamber 110 to the second chamber 120.

The first chamber 110 is defined by a cylinder type outer wall 111 whose top is open and whose side surface and bottom surface are sealed. In the

interior of the first chamber 110, there is provided a valve assembly 140 which is configured to float by a difference in viscosities of the centrifugation substances inputted into the first chamber 110 and which is positioned on a boundary layer between the substances which will be centrifugally separated.

5 The valve assembly 140 is provided so as to prevent the sediments from being mixed with the floating substances and from being discharged outside while the floating substances are decanted toward the second chamber 120 in such a way that the sediments which have relatively larger viscosities and move outward from the center of the rotations during the centrifugation of
10 centrifugation substances are separated from the floating substances which have relatively smaller viscosities and move inward inside the sediments, more specifically move closer to the center of the rotations. The valve assembly 140 is formed in a cup shape whose top is open. Between an outer side surface of the valve assembly 140 and an inner side surface of the first chamber 110,
15 there is formed a gap through which the floating substances pass. A plurality of through holes 141 are formed in the bottom surface of the valve assembly 140 so as to allow the floating substances to pass. Here, the through holes 141 may be formed in the central portion of the bottom surface of the valve assembly 140 while forming concentric circles at regular intervals in circumferential directions.

20 It is preferred that the gap formed between an outer side surface of the valve assembly 140 and an inner side surface of the first chamber 110 and the

plurality of the through holes 141 formed in the bottom surface of the valve assembly 140 are sized to allow the centrifugally separated floating substances to pass but not to allow the sediments to pass.

When the centrifugation is performed as the centrifugal separator starts rotating, the floating substances which have smaller viscosities than the valve assembly 140 pass through the gap between the valve assembly 140 and the first chamber 110 and the plurality of the through holes 141 by means of the centrifugal force and move to the upper side of the valve assembly 140, and the sediments which have larger viscosities than the valve assembly 140 are positioned at the lower side of the valve assembly 140.

In this case, in order for the floating substances to smoothly move through the plurality of the through holes 141 formed in the bottom surface of the valve assembly 140, the valve assembly 140 is configured to reciprocate along a straight line in a longitudinal direction of the first chamber 110 during centrifugation, but is configured not to rotate, thus minimizing any interference between the floating substances which move in an upward direction of the valve assembly 140 and the through holes 141. For this construction, as illustrated in Fig. 3, in an inner side surface of the first chamber 110 and in an outer side surface of the valve assembly 140, there are installed a plurality of guide ribs 114 at regular intervals about the central axis of the first chamber 110 in a predetermined direction which is parallel to the longitudinal direction of the first

chamber 110, and there are also installed a plurality of guide grooves 142 which are configured to match with the guide ribs 114.

As illustrated in Fig. 3, the guide ribs 114 are formed in an inner side surface of the first chamber 110, and the guide grooves 142 are formed in an outer side surface of the valve assembly 140. The guide ribs 114 and the guide grooves 142 are formed in two portions at the intervals of 180°. Here, the guide ribs 114 and the guide grooves 142 may be provided at opposite portions, and the number of the installation portions may be changed.

As illustrated in Fig. 8, a guide groove 114a is formed in an inner side surface of the first chamber 110. A guide rib 142a is formed in an outer side surface of the valve assembly 140. The guide groove 114a and the guide rib 142a are formed at three portions at intervals of 120°. In another exemplary embodiment, the guide groove 114a and the guide rib 142a may be formed at four portions at intervals of 90°. If the installation number of the guide rib and the guide groove may more stably support the valve assembly 140; however friction increases between the guide rib and the guide groove for thereby causing any interference with the movement of the valve assembly 140. In this regard, it is preferred that the installation number of them is 2 to 4.

The second chamber 120 is spaced apart in an outward direction of the first chamber while surrounding part of the outer wall 111 of the first chamber 110. The second chamber 120 includes an inner wall 122 and an outer wall 121

which are concentric to the outer wall 111 of the first chamber 110. Top of the inner wall 122 of the second chamber is connected to top of the first chamber 110 by means of the connection unit 112. The cross section of the second chamber 120 gradually becomes narrowed from its top to bottom. The cross
5 section of the bottom of the second chamber 120 gradually becomes narrowed in a downward direction by means of a first bottom unit 123 and a second bottom unit 124 for the floating substances in the second chamber 120 to be easily discharged. The cover 300 includes a protrusion unit 210 configured to cover an upper surrounding of the connection unit 112 with a space between
10 them, and a concave unit 220 which is formed in an outward direction of the protrusion unit 210. A stepped portion 211 is formed on a boundary layer which is formed by a difference in the heights of the protrusion unit 210 and the concave unit 220.

In the protrusion unit 210, there is provided an input port 212 which is
15 formed in an inward direction of the first chamber 110 for inputting a centrifugation substance such as blood and bone marrow into the first chamber 110. In the concave unit 220, there are provided a discharge port 222 for discharging outside the floating substances centrifugally separated from blood or bone marrow, and an air vent 224 which is configured for air communication
20 in the body for the floating substances to move. Here, the input port 212 and the discharge port 222 are made from sealing materials such as rubber. The

injection of the centrifugation substances through the input port 212 or the discharge of the floating substances through the discharge port 222 may be performed in such a way that a predetermined centrifugation substance is injected into the first chamber by inserting an insertion tube like an injection
5 needle into the input port 212 and the discharge port 222 or the floating substances decanted into and accommodated in the second chamber 120 is discharged outside.

The space between the connection unit 112 of the outer wall 111 of the first chamber 110 and the stepped portion 211 of the cover 200 defines a fluid
10 communication passage "P" between the first chamber 110 and the second chamber 120. The floating substances produced by centrifugation moves through the fluid communication passage "P", to the second chamber 120.

In the present invention, the fluid communication passage "P" is formed over the entire portions of the connection unit 112 around top of the first
15 chamber 110, so the movement direction of the centrifugally separated floating substances is not limited to a predetermined direction, but it may move in all directions around top of the first chamber 110. The floating substances may smoothly move from the first chamber 110 to the second chamber 120 during the decanting procedure after centrifugation, so it is possible to fast separate
20 the floating substances from the sediments and to collect in the second chamber 120.

While the floating substances are being moved through the fluid communication passage "P", to the second chamber 120, the floating substances which pass through the connection unit 112 right above the second chamber 120 directly move into the inner side of the second chamber 120, and
5 the floating substances which pass through the connection unit 112 positioned out of the regions of the surroundings of the first chamber 110 where the second chamber 120 occupies are guided along the guide unit 115, toward the second chamber 120.

In the guide unit 115, there are included an upper sloped surface 115a
10 which is connected to the connection unit 112 in a direction of one side of the first chamber 110 which is opposite to where the second chamber 120 is positioned, and a sloped surface 115b which is downwardly sloped in a helical shape along a circumferential surrounding of the first chamber in both directions in a circumferential direction about the upper sloped surface 115a and extends
15 in a symmetrical shape and is connected to both side surfaces in a circumferential direction of the second chamber 120, respectively. Therefore, the centrifugally separated floating substances pass through the fluid communication passage "P" formed over the entire portions of top of the outer wall 111 of the first chamber 110 and move along the sloped surface 115b of the
20 guide unit 115 and is guided toward the second chamber 120 and is accommodated in the bottom where the cross section of the inner side of the

second chamber 120 is narrow.

The engaging unit 130 which extends in a cam shape from the lower side of the guide unit 115 is fixedly inserted in the frame (not illustrated) of the centrifugal separator and is used as a means for coupling the container for fast
5 centrifugation 10 to the centrifugal separator.

The centrifugation and decanting operations in the container for fast centrifugation 10 will be described with reference to the separation procedures of blood. Figs. 9 to 12 are state views illustrating a centrifugation and a decanting procedure of blood using a container for fast centrifugation according
10 to the present invention.

Fig. 9 is a view illustrating a state after the blood 300 which will be centrifugally separated is injected in the interior of the first chamber 110. When injecting the blood 300, the blood 300 is injected in the interior of the first chamber 110 by inputting an injection needle through the input port 212. In a
15 state that the blood 300 is injected in the interior of the first chamber 110, the container for centrifugation 10 is installed in the centrifugal separator (not illustrated).

When the container for fast centrifugation 10 is rotated for a predetermined time by operating the centrifugal separator in order to separate
20 the red blood cells 301 and the plasma 302 from the blood 300, as illustrated in Fig. 10, the blood 300 is centrifugally separated into the red blood cells 301 and

the plasma 302 based on the centrifugal force applied to the blood 300 and a difference in their viscosities, and the red blood cells 301 which has relatively larger viscosity and fluid resistance are deposited in the bottom of the first chamber 110, more specifically, in the lower side (right side in the drawing of the valve assembly 140, and the plasma 302 which is the floating substances having relatively smaller viscosity and fluid resistance pass through the plurality of the through holes 141 formed in the bottom surface of the valve assembly 140 and the gap formed between an outer side surface of the valve assembly 140 and an inner side surface of the first chamber 110 and moves toward the upper side (left side in the drawing) of the valve assembly 140.

During the above described centrifugation procedures, by means of the guide rib 114 and the guide groove 142 provided in an outer side surface of the valve assembly 140 and in an inner side surface of the first chamber 110, the valve assembly 140 reciprocates along a straight line in a longitudinal direction of the first chamber 110 in a state that its rotational movement is blocked, and the plasma 302 which is centrifugally separated from the blood 300 passes through the plurality of the through holes 141 formed in the bottom surface of the valve assembly 140 and the gap formed between the valve assembly 140 and the first chamber 110 and move smoothly in the upward direction of the valve assembly 140, thus obtaining fast centrifugation.

In this case, the plasma 301 which is a floating substance may smoothly

pass through the plurality of the through holes 141 formed in the bottom surface of the valve assembly 140 and the gap formed between the valve assembly 140 and the first chamber 110 may smoothly pass; however the red blood cells 301 which is the sediment substances having larger viscosity and fluid resistance
5 does not pass through the through holes 141 and the gap due to the centrifugal force but are collected in the lower side of the valve assembly 140, so the red blood cells 301 and the plasma 302 may be separated in both sides about a boundary of the bottom surface of the valve assembly 140.

After the red blood cells 301 and the plasma 302 are centrifugally
10 separated about a boundary of the valve assembly 140 from the blood 300, as illustrated in Fig. 11, the rotational speed of the centrifugal separator is decelerated, and at the container for fast centrifugation 10 is sloped at a predetermine angle for easier decanting. In this case, since the first chamber 110 is sloped in one direction, the red blood cells 301 and the plasma 302 flow
15 down toward the second chamber 120 by self-weight; however the plasma 302 which is a floating substance is slowly decanted toward the second chamber 120 by means of the centrifugal force which is being applied in the direction opposite to the flowing-down direction, so it is possible to prevent the red blood cells 301 from being mixed with the plasma 302 and being decanted together.
20 At this time, part of the decanted plasma 302 directly flows toward the second chamber 120 arranged below and flows inside, and the remaining part of the

plasma 302 passes through the fluid communication passage "P" formed between the body 100 and the cover 200 by means of the rotations of the centrifugal separator and flows along the guide unit 115 and is collected in the second chamber 120.

- 5 While the slow speed rotation of the centrifugal separator is being maintained for a predetermined time, as illustrated in Fig. 12, the valve assembly 140 is pushed toward the fluid communication passage "P" by means of the weight of the red blood cells 301, and the plasma 302 remaining in the first chamber 110 is decanted toward the second chamber 120 and is collected.
- 10 After the plasma 302 is all collected in the second chamber 120, the container for fast centrifugation 10 stops in the initial engaging state by the operations of the centrifugal separator.

 The plasma 302 which is decanted toward the second chamber 120 is collected in the lower side of the second chamber 120 which is narrow defined

15 by means of the first bottom unit 123 and the second bottom unit 124, so it is easy to discharge the plasma 302 outside by inserting an injection needle through the discharge port 222.

 Throughout the specification, the construction and the operations of the container 10 for fast centrifugation were described with reference to the

20 centrifugation and decanting procedures of the blood 300; however the container for fast centrifugation 10 according to the present invention is not

limited thereto, and may be applied to a variety of applications which are designed to centrifugally separate a combined fluid such as bone marrow by components.

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What is claimed is:

1. A container for fast centrifugation, comprising:

a body 100 which includes a first chamber 110 configured to accommodate a centrifugation substance, and a second chamber 120 configured to accommodate the floating substance centrifugally separated from the substance of the first chamber 110 and decanted from the first chamber 110 and which is positioned over an outer surrounding of the first chamber 110; and

a cover 200 which is configured to cover top of the body 100 and defines a fluid communication passage "P" for a decanting substance between the first chamber 110 and the second chamber 120,

wherein in the interior of the first chamber 110, there is provided a valve assembly 140 which is arranged to reciprocate in a longitudinal direction of the first chamber 110 so that it may be positioned on a boundary layer between the centrifugally separated substances and which includes a plurality of through holes 141 in the bottom surface, and

wherein in an inner side surface of the first chamber 110 and in an outer side surface of the valve assembly 140, there are provided a plurality of guide ribs 114 and a plurality of guide grooves 142 which are formed matching with one another in parallel to a longitudinal direction of the first chamber 110 and which are spaced apart at regular intervals about the central axis of the first chamber 110, by means of which the reciprocating movement of the valve

assembly 140 is allowed, but its rotational movement is blocked, and

wherein during the centrifugation, the centrifugally separated floating substances move through the plurality of the through holes 141 and at the same time move through the gap formed between an outer side surface of the valve assembly 140 and an inner side surface of the first chamber 110.

2. The container of claim 1, wherein the valve assembly 140 is formed in a cup shape whose top is open and whose bottom surface and side surface are connected, and the through holes 141 formed in the bottom surface of the valve assembly 140 are formed in the central portion of the bottom surface of the valve assembly 140 and are formed at regular intervals in concentric shapes in a circumferential direction.

3. The container of claim 1, wherein the gap formed between the valve assembly 140 and the first chamber 110 and the through holes 141 are sized to allow the floating substances separated from the centrifugation substances during centrifugation to pass, but not to allow the sediments separated from the centrifugation substance to pass.

4. The container of any of claims 1 to 3, wherein in the body 100, there is provided a guide unit 115 which is in communication with the fluid

communication passage "P" and is configured to surround an outer side surface of the first chamber 110 so as to guide the decanted floating substances toward the second chamber 120 and is sloped toward the second chamber 120.

5 5. The container of claim 4, wherein on top of the outer wall 111 of the first chamber 110, there is provided a connection unit 112 so as to define the fluid communication passage "P", and in the cover 200, there are provided a protrusion unit 210 configured to cover an upper surrounding of the connection unit 112 with a predetermined space between them, and a concave unit 220
10 which is formed in an outward direction of the protrusion unit 210, and the fluid communication passage "P" is formed over an upper surrounding of the first chamber 110 by means of a space between the connection unit 112 and a stepped portion 211 formed on a boundary between the protrusion unit 210 and the concave unit 220.

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6. The container of claim 5, wherein in the bottom surface of the guide unit 115, there are provided an upper sloped surface 115a which is spaced apart from the concave portion 220 of the cover 200 in a direction of one side of the first chamber 110 which is opposite to where the second chamber 120 is
20 positioned, and a sloped surface 115b which extends from the upper sloped surface 115a in both sides along a circumferential surrounding of the first

chamber 110 and is connected to the second chamber 120.

7. The container of claim 6, wherein the sloped surface 115b is formed in a helical shape, and is formed in a symmetrical shape around the first chamber
- 5 110 about the sloped surface 115a.

8. The container of claim 1, wherein the second chamber 120 has a cross section which gradually becomes narrowed from its top to bottom.

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