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(54) Title: DRAINAGE BAG FOR COLLECTING MEDICAL WASTE FLUID AND CORRESPONDING MEDICAL KIT

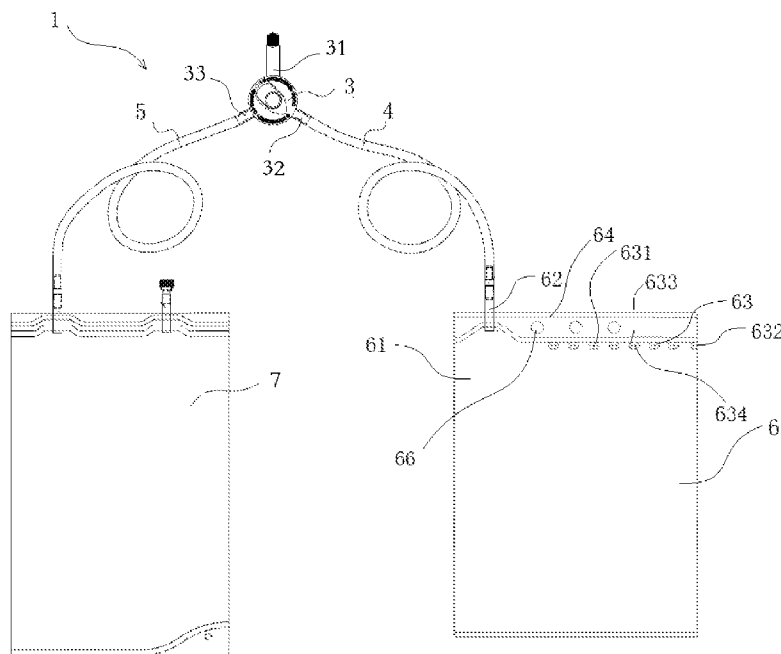


Fig.1

(57) Abstract: Disclosed are a drainage bag for collecting a medical waste fluid, and a medical kit comprising the drainage bag, an easy and fast draining can be achieved without using any special tools. The drainage bag comprises a bag body configured to define an inner cavity for accommodating the medical waste fluid; an inlet port configured to be fluidly connected with the inner cavity to allow the medical waste fluid to flow into the inner cavity; and a sealing structure formed on the bag body and configured to be directly and manually breakable so as to drain the medical waste fluid out of the inner cavity via the broken sealing structure.



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Drainage Bag for Collecting Medical Waste fluid and Corresponding Medical Kit

Technical Field

The disclosure relates to a drainage bag for collecting a medical waste fluid, especially for a dialysis treatment, and a corresponding medical kit.

Background Art

A dialysis treatment is a procedure for removing toxic substances and metabolites normally removed by the kidneys, and for aiding in regulation of fluid and electrolyte balance.

The dialysis treatment may be carried out by various types of dialysis procedures, such as a hemodialysis and a peritoneal dialysis (PD). There are mainly two types of peritoneal dialysis: a continuous ambulatory peritoneal dialysis (CAPD) and an automated peritoneal dialysis (APD).

In CAPD and APD, a drainage bag is usually utilized to collect a PD effluent from a peritoneal cavity of a patient and then the drainage bag is emptied by commonly disposing of the PD effluent in the toilet. The emptying is often executed by the following methods:

- Cutting a hole in the drainage bag by using scissors, which imposes potential hazard of injury for users, particularly frail patients.
- Cutting a drainage transfer tube and draining the PD effluent through the tube. As the tube has a rather small hole, the draining time is quite long.
- For CAPD, reverse flushing the PD effluent through a disc connector, which also results in longer waiting time.

Thus, there is need in the field to modify and optimize the drainage bag for easier, faster and safer draining of the PD effluent collected in the drainage bag.

Summary of the Disclosure

In view of the problems existing in the prior art, an object of the disclosure is to provide an improved drainage bag for collecting a medical waste fluid, especially for a dialysis treatment, and an improved medical kit.

For achieving this object, according to a first aspect of the present disclosure, provided is a drainage bag for collecting a medical waste fluid, for example a

dialysis fluid, comprising: a bag body configured to define an inner cavity for accommodating the medical waste fluid; an inlet port configured to be fluidly connected with the inner cavity to allow the medical waste fluid to flow into the inner cavity; and a sealing structure formed on the bag body and configured to be directly and manually breakable so as to drain the medical waste fluid out of the inner cavity via the broken sealing structure.

According to an optional embodiment of the present disclosure, the drainage bag is configured as a drainage bag for a peritoneal dialysis; and/or the sealing structure comprises a tearable structure; and/or the sealing structure comprises a peelable structure; and/or the sealing structure comprises a self-sealing opening structure; and/or the sealing structure comprises a thread pulling-opening seal which contains a thread or strip and can be broken by pulling the thread or strip.

According to an optional embodiment of the present disclosure, the tearable structure is only formed at an edge of the bag body; and/or the peritoneal dialysis is a continuous ambulatory peritoneal dialysis or an automated peritoneal dialysis; and/or the tearable structure comprises a first welding structure; and/or the peelable structure comprises a second welding structure.

According to an optional embodiment of the present disclosure, the first welding structure comprises at least one welding ring which defines a through hole or slit in a center thereof, which through hole or slit may be in any suitable shape; and/or the second welding structure comprises a peelable welding seam.

According to an optional embodiment of the present disclosure, the at least one welding ring comprises a series of welding rings, preferably spaced from each other; and/or the peelable welding seam is configured as a continuous welding seam.

According to an optional embodiment of the present disclosure, the welding ring is configured in a circular or oval shape; and/or at least one geometrical characteristic of the welding ring is selected to facilitate tearing of the sealing structure.

According to an optional embodiment of the present disclosure, the at least one geometrical characteristic comprises a size and/or a shape of the welding ring and/or a distance of two adjacent welding rings.

According to an optional embodiment of the present disclosure, the series of welding rings is at least partially disposed adjacent to an edge of the bag body at which the inlet port is disposed; or the series of welding rings is at least partially

disposed along an edge, preferably a lateral edge, of the bag body; or the series of welding rings is at least partially disposed at a corner of the bag body.

According to an optional embodiment of the present disclosure, the welding ring is incomplete at an edge of the bag body so that the through hole or slit of the welding ring extends to the edge of the bag body.

According to an optional embodiment of the present disclosure, the peelable structure is disposed at a corner of the bag body; and/or a corner portion of the bag body outside of the peelable structure is configured as at least one peeling handle for facilitating the peeling of the peelable structure.

According to an optional embodiment of the present disclosure, two opposite ends of the peelable structure extend to respective edges of the bag body; and/or the peelable structure is configured to be adapted to be folded along an inner edge of the peelable structure to protect the peelable structure before peeling the peelable structure.

According to an optional embodiment of the present disclosure, the peeling handles are configured to be adapted to be folded along with the peelable structure, and/or the peeling handle has at least one bump on at least one surface of the peeling handle.

According to an optional embodiment of the present disclosure, the drainage bag is provided with at least one hanging hole, preferably three hanging holes, for the drainage bag; and/or the medical waste fluid is a peritoneal dialysis effluent; and/or the sealing structure is configured in a linear or non-linear manner.

According to a second aspect of the present disclosure, provided is a medical kit, particularly for a continuous ambulatory peritoneal dialysis, wherein the medical kit comprises the drainage bag as described above.

According to an optional embodiment of the present disclosure, the medical kit is for a single-bag continuous ambulatory peritoneal dialysis system or a double-bag continuous ambulatory peritoneal dialysis system.

According to exemplary embodiments of the present disclosure, easy, safe and fast draining can be achieved without using any special tools, particularly hazard causing elements, such as scissors, so that a risk of injury will be minimized. Moreover, a draining opening can be formed in a relatively controllable manner.

Brief Description of the Drawings

The disclosure and advantages thereof will be further understood by reading the

following detailed description of some preferred exemplary embodiments with reference to the drawings in which:

Fig.1 shows a double-bag continuous ambulatory peritoneal dialysis kit comprising a drainage bag according to an exemplary embodiment of the present invention, wherein a sealing structure of the drainage bag comprises a tearable structure.

Fig.2 shows separately one welding ring with a through hole or slit according to an exemplary embodiment of the present disclosure in an enlarged view.

Fig.3 shows a drainage bag according to another exemplary embodiment of the present disclosure, wherein a series of welding rings is disposed along a lateral edge of the bag body of the drainage bag.

Fig.4 shows a drainage bag according to still another exemplary embodiment of the present disclosure, wherein the series of welding rings is disposed at one of two corners of the bag body adjacent to the inlet port of the drainage bag.

Fig.5 shows a drainage bag according to an exemplary embodiment of the present disclosure, wherein the sealing structure of the drainage bag comprise a peelable structure.

Fig.6 shows a folded status of the peelable structure of the sealing structure of the drainage bag as shown in Fig.5.

Detailed Description of Preferred Embodiments

Some exemplary embodiments of the present disclosure will be described hereinafter in more details with reference to the drawings to better understand the basic concept and advantages of the present disclosure.

The present disclosure relates to an improvement of a drainage bag for a dialysis treatment, especially a peritoneal dialysis treatment, for example a double-bag continuous ambulatory peritoneal dialysis treatment. For better understanding of the basic concept of the present disclosure, a double-bag CAPD kit 1 according to an exemplary embodiment of the present invention will be described with reference to Fig.1.

As shown in Fig.1, the double-bag CAPD kit 1 may mainly comprise a connector 3 (here exemplarily in a form of a disc connector), a drainage transfer tubing 4, a solution transfer tubing 5, a drainage bag 6, and a solution bag 7.

The connector 3 may have a first port 31, a second port 32 acting as a drainage port, and a third port 33 acting as a solution port. The first port 31 may be

configured to be connected with a catheter or catheter extension (not shown) from a patient to infuse a fresh dialysis solution into a peritoneal cavity of the patient for executing the peritoneal dialysis treatment or drain a PD effluent from the peritoneal cavity of the patient. The second port 32 can be fluidly connected with the drainage bag 6 by the drainage transfer tubing 4, and the third port 33 can be fluidly connected with the solution bag 7 by the solution transfer tubing 5. The drainage bag 6 will be described in details below in connection with some exemplary embodiments.

According to an exemplary embodiment of the present disclosure, as shown in Fig.1, the drainage bag 6 may comprise: a bag body 61 configured to define an inner cavity for accommodating a dialysis fluid, for example the PD effluent; an inlet port 62 configured to be fluidly connected with the inner cavity to allow the dialysis fluid to flow into the inner cavity; and a sealing structure 63 formed on the bag body 61 and configured to be directly manually breakable so as to drain the dialysis fluid out of the inner cavity via the broken sealing structure 63. In particular, the sealing structure 63 can be broken without any separate tools, such as scissors.

According to an exemplary embodiment of the present disclosure, as shown in Fig.1, the sealing structure 63 may comprise a tearable structure 631, which allows to be torn by hand from a tearing starting point 632.

According to an exemplary embodiment of the present disclosure, the tearable structure 631 may comprise a welding structure.

As shown in Fig. 1, the welding structure may comprise at least one welding ring 633 which defines a through hole or slit 634 in a center thereof, with the through hole or slit being in any suitable shape.

Fig.2 shows separately one welding ring 633 according to an exemplary embodiment of the present disclosure in an enlarged view. The welding ring 633 here is configured in an oval shape and the through hole or slit 634 is configured in an elongated shape. The through hole or slit 634 has a tapered cutout 6341 at each of two opposite ends thereof, which can facilitate tearing of the welding ring 633. As shown in Fig.2, the welding ring 633 comprises a welding portion 6342 around the through hole or slit 634.

As can be seen from Fig.1, the tearing starting point 632 may be formed by an incomplete welding ring 633 (the left one in Fig.1) so that the through hole or slit 634 extends to an edge of the drainage bag 6. In this case, a tearing operation can

start from the tearing starting point 632.

According to an exemplary embodiment of the present disclosure, as shown in Fig.1, the at least one welding ring may comprise a series of welding rings 633, preferably spaced from each other. This design can make sure both integrity of the drainage bag 6 (no leakage) before tearing, and easy-tearing along the series of holes or slits 634.

Although, as shown in Fig.2, the welding ring 633 is configured in the oval shape, a skilled person in the art may understand that the present disclosure is not limited to this shape and instead the welding ring 633 may be configured in any suitable shapes, for example a circular shape or a rectangular shape.

Advantageously, at least one geometrical characteristic of the welding ring 633 may be selected to facilitate the tearing of the sealing structure, particularly such that a big hole can be formed for fast draining. The at least one geometrical characteristic may comprise a size and/or a shape of the welding ring 633 and/or a distance of two adjacent welding rings 633. These geometrical characteristics can be optimized by experimentation and/or simulation.

According to an exemplary embodiment of the present disclosure, as shown in Fig.1, the series of welding rings 633 may be at least partially disposed adjacent to an edge 64 of the bag body 61 at which the inlet port 62 is disposed, namely an upper edge as shown in Fig.1. Preferably, all of the series of welding rings 633 may be disposed adjacent to the edge 64. The series of welding rings 633 may be arranged in a linear manner, as shown in Fig.1. Of course, the series of welding rings 633 also may be arranged in other suitable manners, for example in a curved manner.

The skilled person in the art may understand that the series of welding rings 633 also may be disposed at any suitable positions as long as the tearing thereof is facilitated and benefits emptying of the dialysis fluid from the inner cavity of the drainage bag 6.

When starting to tear from the incomplete welding ring 633, a tearing opening is formed starting from the cutout 6341 of the through hole or slit 634 of the incomplete welding ring 633 adjacent to an edge of the bag body 6. Then the tearing is extended toward the next welding ring 633 across the welding portion 6342 of the incomplete welding ring 633 and then across a portion of the bag body 61 between the two adjacent welding ring 633. Similarly, the tearing opening will be extended toward the further next welding ring 633. As the

portion of the bag body 61 between the two adjacent welding ring 633 is not welded, a series of successive draining holes can be formed finally to drain the PD effluent collectively. That is, a draining opening is formed by the series of successive draining holes. A distance between two adjacent welding ring 633 may be selected to be greater than a size of the welding ring 633 in a tearing direction, so that the draining holes are relatively large so as to facilitate emptying of the PD effluent.

The skilled person in the art may understand that the tearing may be guided along the series of welding rings 633 and thus the draining opening can be formed in a relatively controllable manner.

Alternatively, it is also possible that only one welding structure is formed at an edge of the bag body 61 and a tearing starting opening is formed on the welding structure. For example, as shown in Fig.1, only the incomplete welding ring 633 can be left and the cutout 6341 acts as the tearing starting opening. In this case, a continuous tearing opening can be formed when tearing from tearing the starting opening. Obviously, in this case, the welding structure is not limited to a ring shape, but may be in any suitable shape.

Fig.3 shows the drainage bag 6 according to another exemplary embodiment of the present disclosure, wherein the series of welding rings 633 may be at least partially disposed along an edge, preferably a lateral edge 65, of the bag body 61 in a linear or non-linear manner.

Fig.4 shows the drainage bag 6 according to still another exemplary embodiment of the present disclosure, wherein the series of welding rings 633 may be at least partially disposed at a corner of the bag body 61, particularly at one of two corners of the bag body 61 adjacent to the inlet port 62. Similarly, the series of welding rings 633 also may be arranged in a linear or non-linear manner.

According to an exemplary embodiment of the present disclosure, said sealing structure may comprise a peelable structure. Fig.5 shows the drainage bag 6 according to an exemplary embodiment of the present disclosure, wherein the sealing structure 63 comprises a peelable structure 635.

Preferably, the peelable structure 635 may comprise a welding structure 636. The welding structure 636 may be formed by a thermal bonding.

According to an exemplary embodiment of the present disclosure, the welding structure 636 may comprise a peelable welding seam, preferably a continuous welding seam, as shown in Fig.5. The continuous welding seam extends

continuously, not like the series of welding rings 633.

As shown in Fig.5, according to an exemplary embodiment of the present disclosure, the peelable structure 635 may be disposed at a corner of the bag body 61, particularly at one of two corners of the bag body 61 adjacent to the inlet port 62.

According to an exemplary embodiment of the present disclosure, a corner portion 637 of the bag body 61 outside of the peelable structure 635 may be configured as at least one (preferably two) peeling handle for facilitating the peeling of the peelable structure 635.

According to an exemplary embodiment of the present disclosure, two opposite ends of the peelable structure 635 may extend to respective edges of the bag body 61, as shown in Fig.5. In this case, the peelable structure 635 extends until the edges of the bag body 61 so as to form a big opening after peeling.

Fig.6 shows a folded status of the peelable structure 635 of the sealing structure 63 of the drainage bag 6 as shown in Fig.5. In the folded status, the peelable structure 635 is folded inward.

According to an exemplary embodiment of the present disclosure, as shown in Fig.6, the peelable structure 635 may be configured to be adapted to be folded along an inner edge of the peelable structure 635 to protect the peelable structure from being broken before the peelable structure 635 is peeled. This design can make sure both integrity of the drainage bag 6 (no leakage) before peeling, and easy-peeling after unfolding the peelable structure.

The inner edge of the peelable structure 635 is configured as a folding line which may be formed for example by ironing.

As shown in Fig.6, the at least one peeling handle may be configured to be adapted to be folded along with the peelable structure 635.

According to an exemplary embodiment of the present disclosure, the peeling handles may have bump dots 638 on at least one surface of the peeling handles. As can be seen from Fig.5 and Fig.6, the peeling handle has the bump dots 638 on both of the opposite surfaces thereof. The bump dots 638 can facilitate peeling of the peelable structure 635 by means of the peeling handle.

As can be seen from the above figures. According to an exemplary embodiment of the present disclosure, the drainage bag 6 may be provided with at least one hanging hole 66, preferably three hanging holes 66, for hanging the drainage bag

6. For example, the drainage bag 6 can be hanged by means of the hanging holes 66. The hanging hole 66 may have any suitable shape, for example circular shape.

According to an exemplary embodiment of the present disclosure, the sealing structure 63 may be configured in a linear manner.

The skilled person in the art may understand that the sealing structure may comprise both of the tearable structure and the peelable structure and the tearable structure and the peelable structure may be combined in any suitable manner.

The skilled person in the art also may understand that except for the above embodiments, the sealing structure may be formed in other suitable manners within the inventive concept, as long as it can be broken manually. For example, the sealing structure may comprise or be formed by a self-sealing opening and/or a thread pulling-opening seal, which is known per se and thus is not described here in details for simplicity.

The skilled person in the art also may understand that the drainage bag also may be used in a single-bag continuous ambulatory peritoneal dialysis system or an automated peritoneal dialysis system, although it was described above in connection with the double-bag continuous ambulatory peritoneal dialysis system. In fact, the inventive drainage bag also can be applied in other applications, for example, a continuous renal replacement therapy (CRRT). In principle, the inventive drainage bag can be used to collect any medical waste fluid and allow for easy disposing of the waste fluid later.

While certain embodiments have been described, these embodiments have been presented by way of example only, and are not intended to limit the scope of the disclosure. The attached claims and their equivalents are intended to cover all the modifications, substitutions and changes as would fall within the scope and spirit of the disclosure.

Claims

1. A drainage bag for collecting a medical waste fluid, for example a dialysis fluid, comprising:

a bag body configured to define an inner cavity for accommodating the medical waste fluid;

an inlet port configured to be fluidly connected with the inner cavity to allow the medical waste fluid to flow into the inner cavity; and

a sealing structure formed on the bag body and configured to be directly and manually breakable so as to drain the medical waste fluid out of the inner cavity via the broken sealing structure.

2. The drainage bag according to claim 1, wherein

the drainage bag is configured as a drainage bag for a peritoneal dialysis; and/or

the sealing structure comprises a tearable structure; and/or

the sealing structure comprises a peelable structure; and/or

the sealing structure comprises a self-sealing opening structure; and/or

the sealing structure comprises a thread pulling-opening seal.

3. The drainage bag according to claim 2, wherein

the tearable structure is only formed at an edge of the bag body; and/or

the peritoneal dialysis is a continuous ambulatory peritoneal dialysis or an automated peritoneal dialysis; and/or

the tearable structure comprises a first welding structure; and/or

the peelable structure comprises a second welding structure.

4. The drainage bag according to claim 3, wherein

the first welding structure comprises at least one welding ring which defines a through hole or slit in a center thereof; and/or

the second welding structure comprises a peelable welding seam.

5. The drainage bag according to claim 4, wherein

the at least one welding ring comprises a series of welding rings, preferably spaced from each other; and/or

the peelable welding seam is configured as a continuous welding seam.

6. The drainage bag according to claim 4 or 5, wherein
the welding ring is configured in a circular or oval shape; and/or
at least one geometrical characteristic of the welding ring is selected to facilitate tearing of the sealing structure.

7. The drainage bag according to claim 6, wherein
the at least one geometrical characteristic comprises a size and/or a shape of the welding ring and/or a distance of two adjacent welding rings.

8. The drainage bag according to any one of claims 5-7, wherein
the series of welding rings is at least partially disposed adjacent to an edge of the bag body at which the inlet port is disposed; or
the series of welding rings is at least partially disposed along an edge, preferably a lateral edge, of the bag body; or
the series of welding rings is at least partially disposed at a corner of the bag body.

9. The drainage bag according to any one of claims 4-8, wherein
the welding ring is incomplete at an edge of the bag body so that the through hole or slit of the welding ring extends to the edge of the bag body.

10. The drainage bag according to any one of claims 2-5, wherein
the peelable structure is disposed at a corner of the bag body; and/or
a corner portion of the bag body outside of the peelable structure is configured as at least one peeling handle for facilitating peeling of the peelable structure.

11. The drainage bag according to claim 10, wherein
two opposite ends of the peelable structure extend to respective edges of the bag body; and/or
the peelable structure is configured to be adapted to be folded along an inner edge of the peelable structure to protect the peelable structure before peeling the peelable structure.

12. The drainage bag according to claim 11, wherein
the peeling handles are configured to be adapted to be folded along with the peelable structure, and/or

the peeling handle has at least one bump on at least one surface of the peeling handle.

13. The drainage bag according to any one of claims 1-12, wherein
the drainage bag is provided with at least one hanging hole, preferably three hanging holes, for hanging the drainage bag; and/or
the medical waste fluid is a peritoneal dialysis effluent; and/or
the sealing structure is configured in a linear or non-linear manner.

14. A medical kit, particularly for a continuous ambulatory peritoneal dialysis, wherein the medical kit comprises the drainage bag according to any one of claims 1-13.

15. The medical kit according to claim 14, wherein the medical kit is for a single-bag continuous ambulatory peritoneal dialysis system or a double-bag continuous ambulatory peritoneal dialysis system.

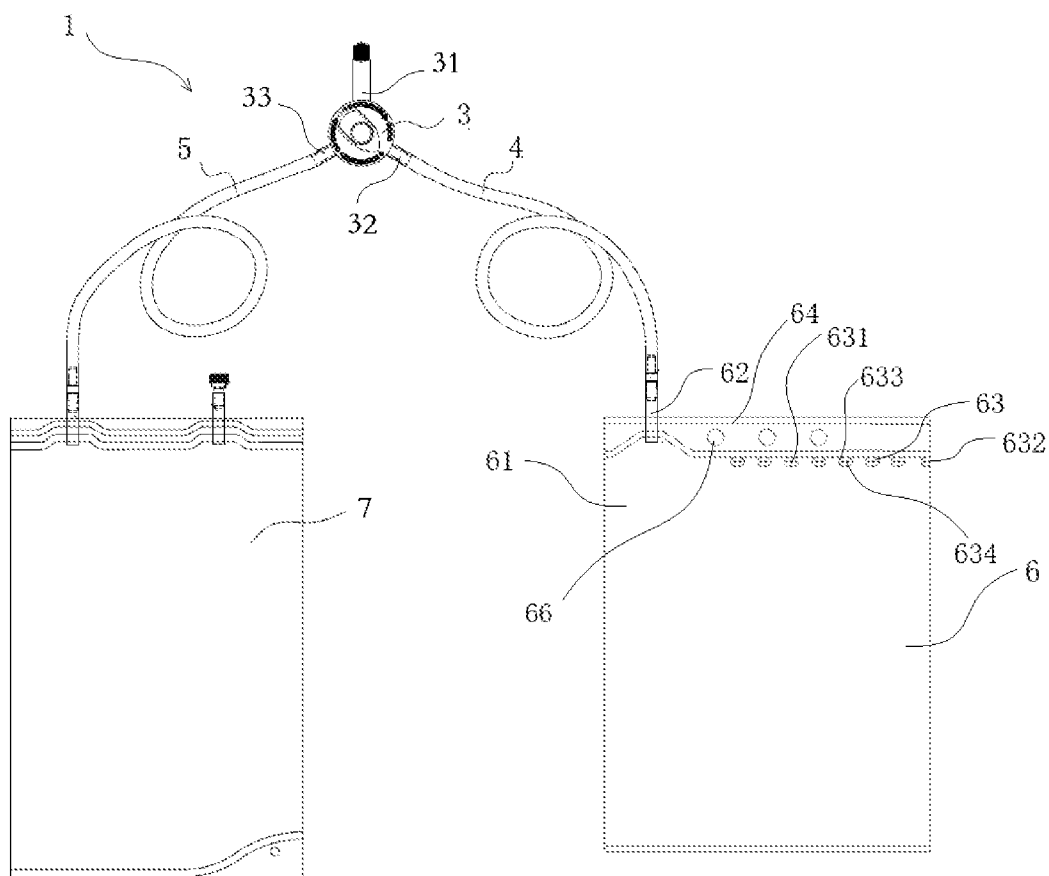


Fig.1

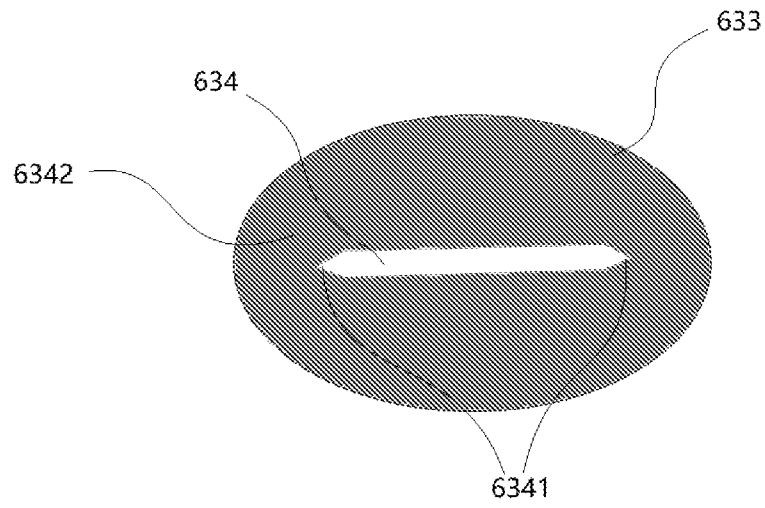


Fig.2

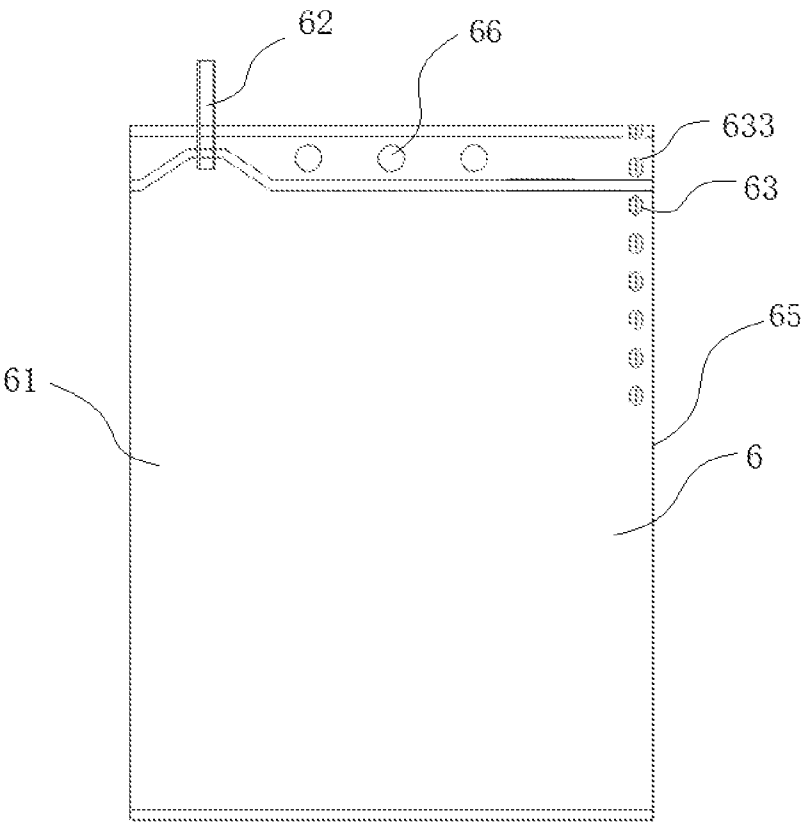


Fig.3

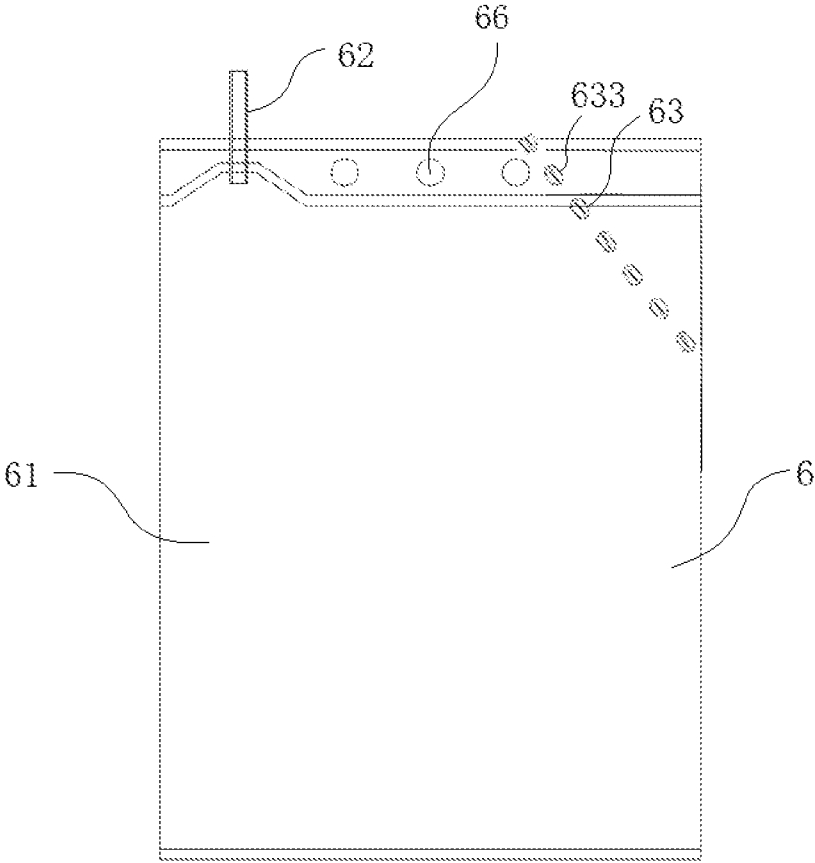


Fig.4

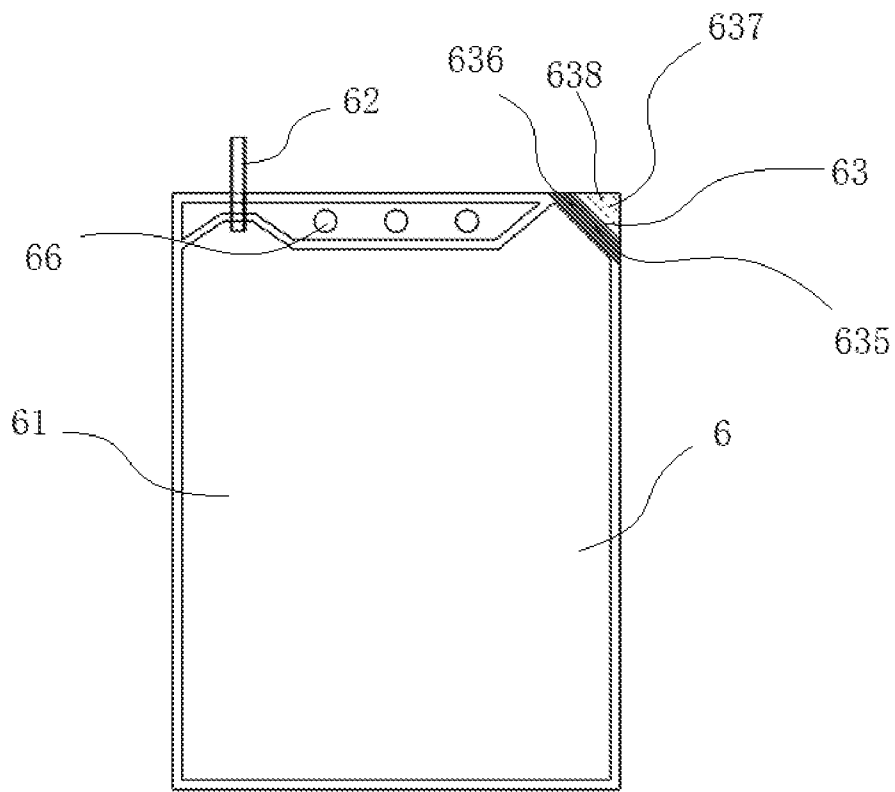


Fig.5

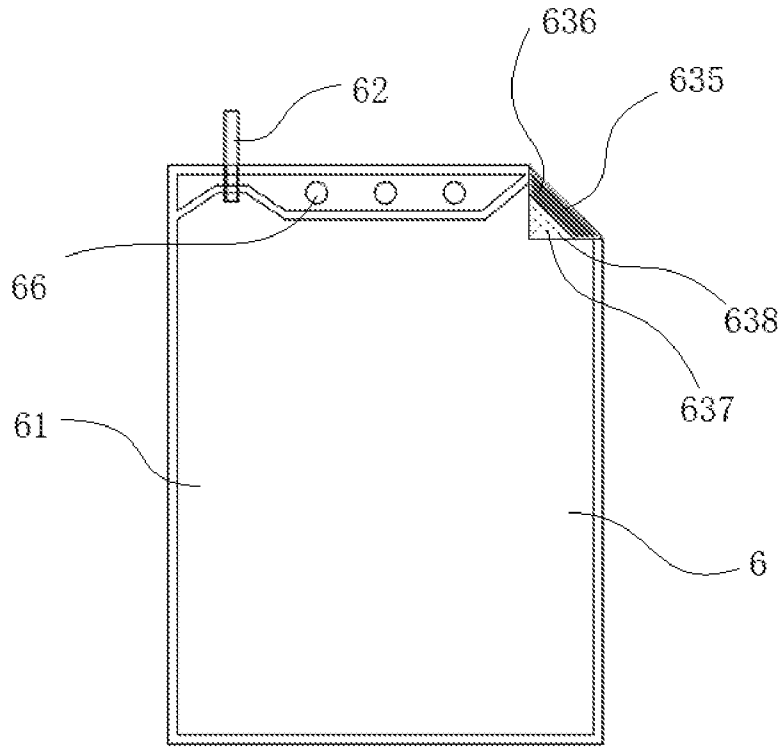


Fig.6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2021/092333

A. CLASSIFICATION OF SUBJECT MATTER

A61M 1/28(2006.01)i; A61M 1/16(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A61M1; A61J1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNABS;CNKI;VEN: drain+, dialy+, wast+, bag, container, collect+, break+, broken, fragil+, tear+, peel+, weak+.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2014121613 A1 (KIMBERLY CLARK CO) 01 May 2014 (2014-05-01) see the description, paragraphs 18-28, and figures 1, 3	1-15
X	CN 208958916 U (CHENGDU XINJIN SHIFENG MEDICAL APPARATUS & INSTRUMENT CO LTD) 11 June 2019 (2019-06-11) see the description, paragraphs 27-36, and figures 1-6	1-15
A	CN 211301421 U (TEDA INT CARDIOVASCULAR HOSPITAL) 21 August 2020 (2020-08-21) the whole document	1-15
A	CN 205041861 U (ZHANG ZHIJIAN) 24 February 2016 (2016-02-24) the whole document	1-15
A	CN 211797946 U (UNIV JIAMUSI) 30 October 2020 (2020-10-30) the whole document	1-15



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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Date of the actual completion of the international search

04 January 2022

Date of mailing of the international search report

25 January 2022

Name and mailing address of the ISA/CN

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INTERNATIONAL SEARCH REPORT
Information on patent family members

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				WO	2019161667	A1	29 August 2019
				US	2020171218	A1	04 June 2020
CN	211301421	U	21 August 2020	None			
CN	205041861	U	24 February 2016	None			
CN	211797946	U	30 October 2020	None			