

**PAPER B: AMENDMENT OF A PATENT SPECIFICATION**  
**8 October 2014, Wednesday**  
**1330 – 1730 hrs**

Maximum Time: 4 Hours (includes reading time)

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**INSTRUCTIONS TO CANDIDATES**

1. This Paper consists of 19 pages, including this cover page.
2. Type/Write your answers in English. Answers in any other language will not be marked.  
For candidates who opted out from laptop examination: Answers in illegible handwriting will not be taken into consideration.
3. One hardcopy of the question paper is provided, for your reading and for your use (optional) when answering the question(s) in the Answer Script/Answer Booklet(s). For candidates who opted out from laptop examination: You are given two hardcopies of the question paper.
4. Only your answers and/or drawings to the question(s) typed/written or indicated/glued in the Answer Script/Answer Booklet(s) provided by the Examination Secretariat will be considered. Candidates should not change the format of the Answer Script or type in the margin. For candidates who opted out from laptop examination: You are to write on one side of each sheet in the Answer Booklet(s).
5. Information provided in the question(s) may be obtained from actual situations or modified therefrom for the purpose of this examination. You should accept the facts given in the Paper. Assume also that the prior art given is exhaustive.
6. For the purpose of this Paper you do not need to propose any amendments to the description of the Patent Application.

To be continued

INTELLECTUAL PROPERTY OFFICE OF SINGAPORE  
PATENT AGENTS QUALIFYING EXAMINATION 2014

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7. The documents provided in this question are:

- a. Document A: Letter from Client (1 page);
- b. Document B: Singapore Patent Application (5 pages of description plus claims and 2 pages of drawings);
- c. Document C: Written Opinion (2 pages);
- d. Document D1 (PRIOR ART): US 2004/0026448 (5 pages); and
- e. Document D2 (PRIOR ART): JP 64-9187 (2 pages).

End

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**Document A – Letter from Client (1/1)**

Dear Patent Agent

- 5 Thank you for your letter enclosing an official action from IPOS, and also the documents cited by the Examiner in rejecting my application.

I am not sure if the Examiner is correct. My device is not a spray can and I have not seen the product shown in D1 in the market. Why is the Examiner raising these documents? In any case,  
10 the drive mechanism between the plates that squeeze fluid out is different from my product. In fact, the prior art appears to provide many options for fluid delivery, but none are like mine.

My R&D department has also recently told me that we can further improve on the delivery of the fluid if we changed the material of the bag. I think we might want to use a bag that is made of  
15 silicon. Silicon adds more structure to the bag, and may provide the necessary resistance between the plates to improve fluid flow. I would like to see claims for this material.

In any case, I note that the deadline is imminent and cannot be extended. I hope I have provided you with sufficient information for you to file a response, so please proceed  
20 accordingly.

Yours sincerely,

Freddie  
25 Managing Director  
Fluid Delivery Pte Ltd

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**Document B – Singapore Patent Application (1/7)**

[Filing date: 1 June 2013, no priority date]

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**FLUID DELIVERY APPARATUS**

**TECHNICAL FIELD**

- 10    Embodiments of the invention relate to a pump apparatus for fluid delivery, in particularly for providing a constant flow rate for fluid delivery.

**BACKGROUND OF THE INVENTION**

- 15    The advent of elastomeric pump devices has made infusion possible in non-hospital based, ambulatory settings. Typically the construction of such device consists of an elastomeric bladder that stores the energy when filled with drug or fluid. This energy that is derived from the expanded bladder pushes the fluid out via tubing when the bladder compresses. The flow rate is controlled by appropriate sized lumen of a PVC tube or orifice of a glass capillary. Such single-  
20    use devices have the advantages of convenience, safety and without the complications of electronics.

- One major drawback of elastomeric pumps is the difficulty to achieve accurate flow accuracy throughout the entire flow duration: the flow rate of fluid from such a pump is not constant during  
25    the flow duration because the pressure exerted on the fluid in the pump is not constant due to the inherent characteristics of such pumps.

**SUMMARY OF THE INVENTION**

- 30    The invention is defined by the claims.

As it would be appreciated from the description, the pump apparatus proposed by this invention is simple to use provides a constant deliver of fluid.

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**Document B – Singapore Patent Application (2/7)**

**BRIEF DESCRIPTION OF THE DRAWINGS**

- 5 FIG. 1 is an unassembled perspective view of the pump apparatus in accordance with an embodiment of the invention; and

FIGS. 2A to 2C is a cross-sectional view of the pump apparatus in operation.

10 **DETAILED DESCRIPTION**

Referring to Fig. 1, the pump apparatus comprises a housing (e.g. casings 150 and 170) having a compressing member disposed in the housing for squeezing the fluid out of a flexible fluid container. In the housing, the compressing member includes at least a first and a second block member 101 and 102 that are coupled by a resilient means. The resilient means is an elastic band 140 binding first and second block members 101 and 102 together. Elastic band 140 may be made of any stretchable polymer that sits snugly in the grooves 101d and 102d of the respective block members 101 and 102. The objective of these block members 101, 102 is to stretch or extend the elastic band 140 to store a potential energy in elastic band 140, when the contact surfaces 101a, 102a of these block members 101, 102 are displaced from one another. The block members 101, 102 are further arranged in such a configuration that they will have the tendency to assume their original or home position when the stretched or extended elastic band 140 is free to retract to release the potential energy. In essence the elastic potential energy stored in stretched elastic band 140 is transferred to the block members 101, 102 potential energy relative to its home or original position. In one embodiment, the block members 101 and 102 are semi-circular cylinders (Fig. 1). In the home/original position, the two block members 101 and 102 would have their respective contact surfaces 101a and 102a in contact or in closest proximity facing each other.

- 30 A first plate 160 has a surface 160a facing a second plate, or as is in the present embodiment, the second plate may be the bottom casing 170. The opposite surface of the plate 160b are where two wedge members 161, 162 are extended. The wedge members 161, 162 are moveable in a vertical direction in a piston or plunger-like manner when the block members 101 and 102 are displaced in a horizontal or lateral direction. In one embodiment, the wedge

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**Document B – Singapore Patent Application (3/7)**

member 161 has contact edges 161a and 161b, which form a tapered profile with a tip pointing towards the block members 101, 102 and top casing. Similarly, wedge member 162 has contact edges 162a, and 162b that forms similar tapered profile as wedge member 161. The contact edges 161b and 162b of the respective wedge members 161 and 162 are contactable with the contact edge 102c of block member 102. On the other side, contact edges 161a and 162a of wedge members 161 and 162 are contactable with the contact edge 101c of block member 101.

The wedge member has a curvilinear profile. In particular, the contact edges 161a, 161b and 162a, 162b of wedges 161 and 162 are curvilinear such that the surface encompassed by the said edges and the base of the respective wedge members 161, 162 is curved. Such a structure ensures that as the wedge members 161 and 162 displace/move in a vertical direction as a result of the block members 101 and 102 moving away from or towards each other, both the contact points on the contact edge 161a, 161b, 162a, 162b of the wedge members 161a and 162a and the respective contact edges 101c and 102c of the block members change continuously. In other words, there are no points of contact on either wedge members 161, 162 or the edges of blocks 101 and 102 that remain unchanged as the distance (vertical displacement) 16H changes. This preserves the patency of the points of contact better against wear caused by friction as the wedge members 161, 162 are displaced while forming the rift/opening between block members 101 and 102.

The change in gradient of the contour or profile of the wedge members 161, 162 at the effective point of contact with the block members 101, 102 is predetermined to give the necessary incremental lateral displacement of the block members 101, 102 as the wedge members move in a vertical direction so that this displacement in acting together with the stretched state of the elastic band 140 will result in the intended constant vertical force on the plate 160. The pressure exerted on the fluid contained in the bag 125 is significantly more linear.

Figs. 2A to 2C show the pump in operation. The plate 160 on which the wedge members 161 and 162 are rigidly secured is in continuous contact to one surface of the bag 125. The top casing 150 is attached to the bottom casing 170, wherein the top casing 150 supports block members 101, 102 between the top casing 150 and the wedge members 161, 162. Any

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**Document B – Singapore Patent Application (4/7)**

displacement of the block members 101, 102 in the horizontal direction will consequently cause a vertical displacement/movement of the wedge members 161, 162 and the plate 160.

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To start infusion, a clamp 133 (see Fig. 1) or valve on the tubing 131 is released to allow fluid to flow out of the bag 125, which cause the bag 125 to compress or reduce in volume. The stretched elastic band 140 then retracts to release the potential energy, which causes the plate 160 to exert a compressive force on the bag 125, thus expelling the fluid. When the fluid is totally or substantially expelled from the bag 125 (Fig. 2C), the elastic band 140 is in a relaxed state/position or less stretched than its extended position in Fig. 2A.

10

From Fig. 2A, the plate 160 and the wedge members 161 and 162 move downwards in a vertical direction as fluid in the filled elastic bag 125 is totally emptied as shown in Fig. 2C. In Fig. 2B, the plate 160 and the wedge members 161 and 162 are in one of the possible positions in a dispensation cycle when fluid from the elastic bag 125 is being released.

15

In essence the block members 101, 102 and the wedge members 161, 162 function in a manner that transforms direction of the force generated by the stretched elastic band 140 from a horizontal plane to another perpendicular to it (i.e. vertical plane). The resulting vertical force is equivalent to a compressive force exerted by the plate 160 on the bag 125 that expels the fluid.

20

**CLAIMS**

1. An apparatus for fluid delivery, the apparatus comprising:
- (a) a housing having a top casing and a bottom casing; and
  - (b) a compressing member disposed in the housing for squeezing the fluid out.
2. The apparatus according to claim 1, wherein the compressing member further comprising:
- (a) a first plate; and
  - (b) a second plate,
- wherein the infusion bag is disposed between the first and second plates.

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**Document B – Singapore Patent Application (5/7)**

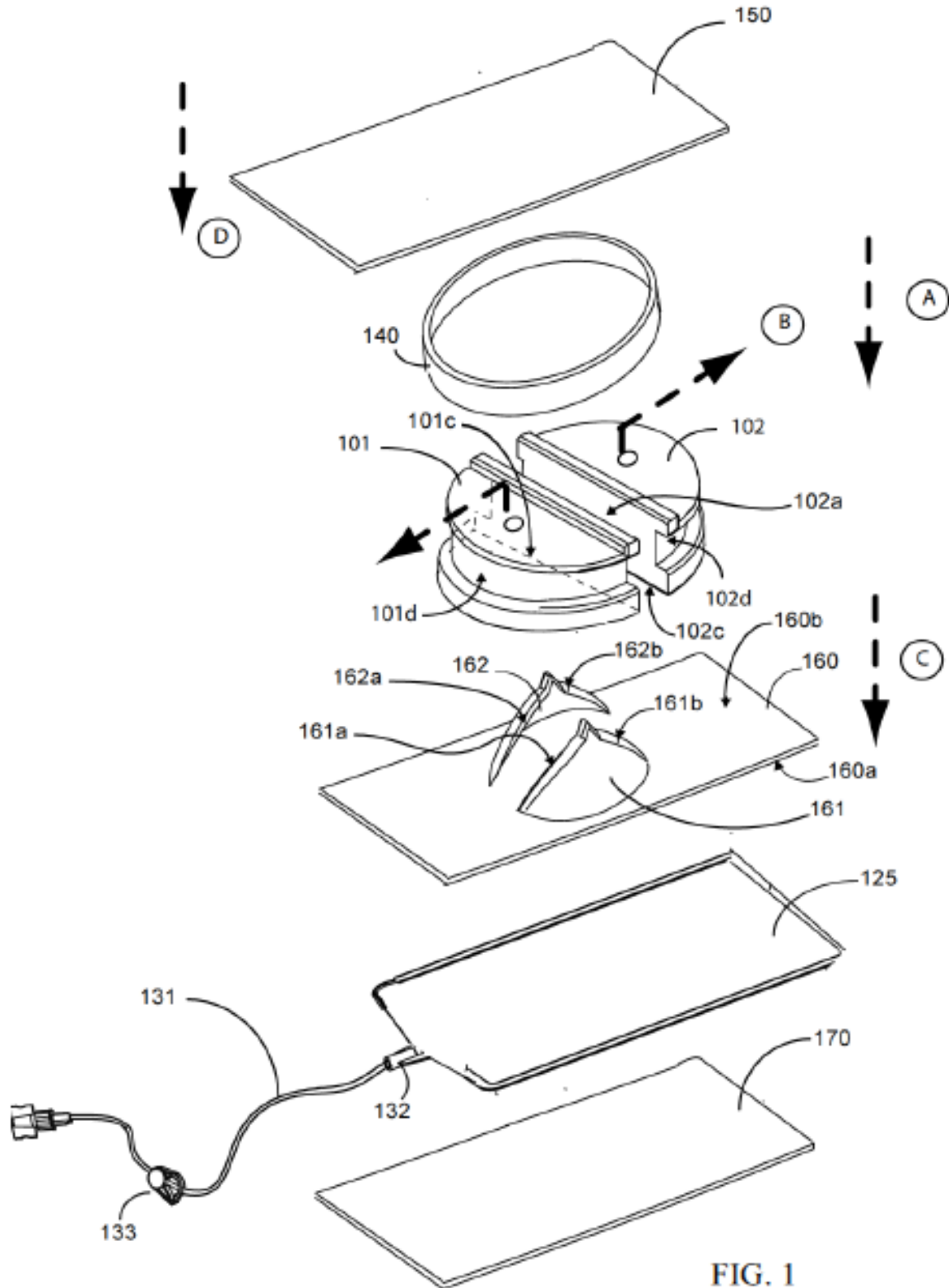
3. The apparatus according to any one of the preceding claims, wherein the first plate is a lower plate and is fixed in position, the second plate is an upper plate and movable in a vertical direction.
4. The apparatus according to claim 3, wherein the second upper plate is movable in the vertical direction under the action of a resilient means.
5. The apparatus according to claim 3, wherein the compressing member further comprising:
- (a) a first block member and a second block member; and
  - (b) a wedge member attached to an upper surface of the second plate, and disposed between the first and second block members,
- wherein the resilient means causes the first and second block members to move towards each other by which the wedge member moves towards the bottom casing to squeeze the fluid out of the infusion bag.
6. The apparatus according to claim 5, wherein the wedge member forms a tapered profile.
7. The apparatus according to claim 6, wherein the narrow end of the wedge member is disposed between the first and second block members.

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**Document B – Singapore Patent Application (6/7)**

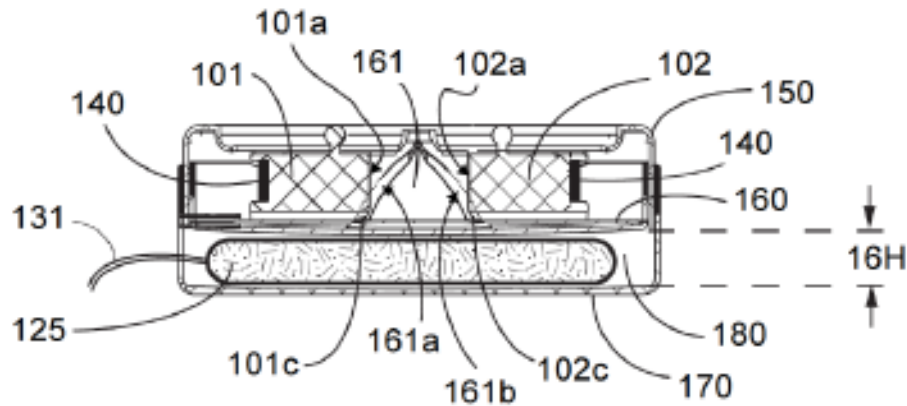


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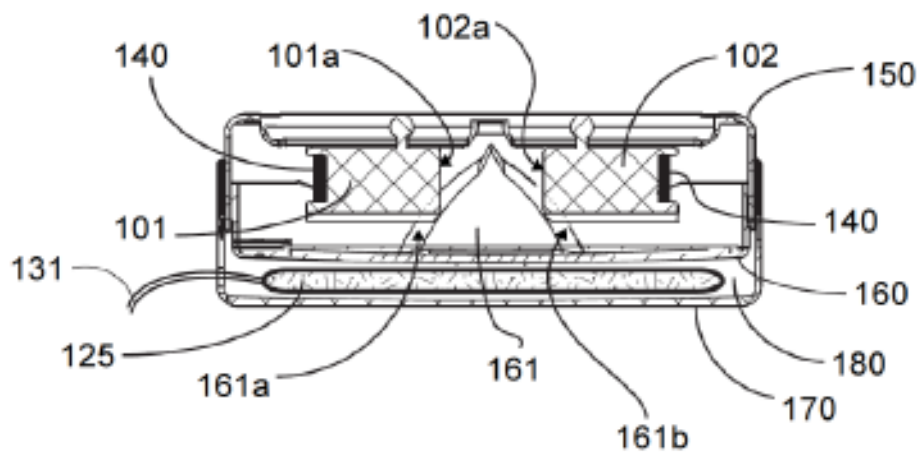
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Maximum Marks: 100

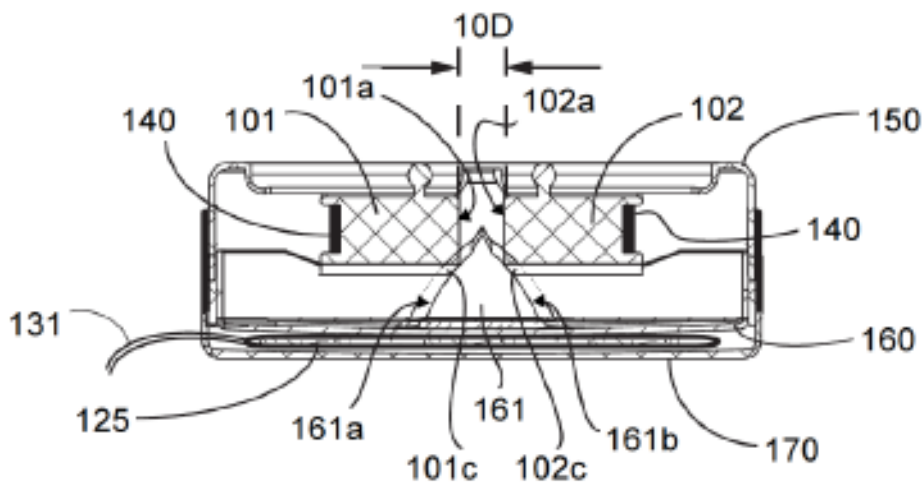
**Document B – Singapore Patent Application (7/7)**



**FIG. 2A**



**FIG. 2B**



**FIG. 2C**

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**Document C – Written Opinion (1/2)**

**Statement:**

- 5    Novelty:                      YES    Claims 5-7  
   NO    Claims 1-4
- Inventive Step:           YES    Claims  
   NO    Claims 1-7
- 10    Industrial Applicability:    YES    Claims 1-7  
   NO    Claims

15    **Citations:**

D1: US 2004/0026448  
D2: JP 64-9187

20    *Novelty*

Claims 1-4 are not new when compared to D1. D1 discloses an apparatus for fluid delivery, the apparatus comprising a housing having a top casing and a bottom casing, and a compressing member for squeezing fluid.

25

*Inventive step*

D1 does not disclose block members and a wedge. However, this compression structure is well known in the art. D2, for example, teaches a dispenser with a flexible bag that uses a wedge member, first and second block members, that causes the first and second block members to move towards each other by which the wedge member moves towards the bottom casing to squeeze the fluid out of the flexible bag. It would be obvious to one of ordinary skill in the art, at the time of the invention, to combine the teachings of D1 and D2 to arrive at the claimed invention.

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**Document C – Written Opinion (2/2)**

*Other observations*

1. The application only discloses a fluid delivery device for infusion therapy. Consequently,  
5 the scope of any independent claim should have been limited to the disclosed subject-matter.
2. Claim 1 is unclear because it does not contain all the features that are considered essential to the invention. Namely, a flexible container is required for the fluid deliver apparatus to actually distribute a fluid.
3. Claim 2 is unclear because there is no antecedent for “infusion bag”.

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**DOCUMENT D1 (PRIOR ART) – US 2004/0026448 (1/5)**

(Published 08.08.2008)

TECHNICAL FIELD

5

The present invention relates to a self-contained infusion device according to the pre-characterizing part of claim 1.

PRIOR ART

10

It is known that infusion is a procedure permitting slow and continuous introduction of a liquid, for example a medicinal substance or blood, into an organism. This operation is currently practiced in human medicine and in veterinary medicine. It is intended to compensate for the losses of biological fluids which an organism has suffered following, for example, a surgical  
15 intervention, a road accident or any circumstance which has resulted in serious physical injuries.

DISCLOSURE OF THE INVENTION

20

According to the invention, a self-contained infusion device, which comprises means for bringing an infusion bag under pressure between a fixed plate and a movable plate driven by an elastic mechanism.

BRIEF DESCRIPTION OF THE DRAWINGS

25

In these drawings:

FIG. 1 shows a front view of the device according to the invention, from the direction of the loading opening;

30

FIG. 2 is a side view of the device in FIG. 1, with the elastic mechanism in the deployed position, the upper plate in the lowered position and the lower plate in the internal position; and

FIG. 3 is a view analogous to FIG. 2, but with the elastic mechanism folded up, the upper plate

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**DOCUMENT D1 (PRIOR ART) – US 2004/0026448 (2/5)**

in the raised position and the lower plate in the external position, ready for receiving an infusion bag.

5

**EMBODIMENT OF THE INVENTION**

FIGS. 1 to 3 are diagrammatic representations of the active part of the device according to the invention. The optional casing is basically made up of a horizontal bottom panel 1, an upper  
10 panel 2, side panels 3, 4 and, possibly, a front panel 5 and rear panel 6.

A front view of the device according to the invention has been shown in FIG. 1. This figure shows the lower plate 8 which supports an infusion bag 9; this lower plate 8 can be equipped with lateral shoulders 10, 11 which in particular facilitate the correct positioning of the infusion  
15 bag. The lower plate 8 rests on a support element 12 which is fixed to the bottom panel 1 and on which it can slide horizontally via slide rails 13 or the like. The sliding movement takes place between an internal or retracted position (FIG. 2), which is the working position and the rest position, and an external or extracted position (FIG. 3) which is the loading position.

20 Arranged above the lower plate 8 there is an upper plate 14 which is able to move in the vertical direction, under the action of an elastic mechanism 15 known *per se* in the field. This mechanism and its action can better be seen in FIGS. 2 and 3. The upper plate 14 is fastened to the elastic mechanism 15 by means known *per se* and not shown here.

25 As seen in FIG. 2, the elastic mechanism 15 is made up of two sets of intersecting levers 16, 17 which are articulated on one another at their centre and together define a vertical plane. At one of its ends, for example towards the rear of the device, the lever 16 of each set is articulated on the upper frame of the device; similarly, the lever 17 of each set can be articulated via its rear end on the upper plate 14. At their other end, the two levers 16 are joined to one another via a  
30 transverse shaft 18 which for example rolls in slide rails provided on the upper plate 14; likewise, the other ends of the two levers 17 are joined to one another via a transverse shaft 19 which rolls on the upper frame. Moreover, traction springs 20, 21 are stretched, respectively, between the upper ends and between the lower ends of the intersecting levers 16, 17 of each set.

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**DOCUMENT D1 (PRIOR ART) – US 2004/0026448 (3/5)**

A control means such as a crank activating a worm wheel and an endless screw, make it possible to vary the angle of opening of the intersecting levers of each set and, consequently, the tension in the springs 20, 21 of the two sets and the vertical position of the upper plate 14. The point of application of the priming force on these control means is preferably situated in the front face 5 of the device so as to facilitate access thereto and to limit the lateral size of the device.

10 The device according to the invention is operated in the following way:

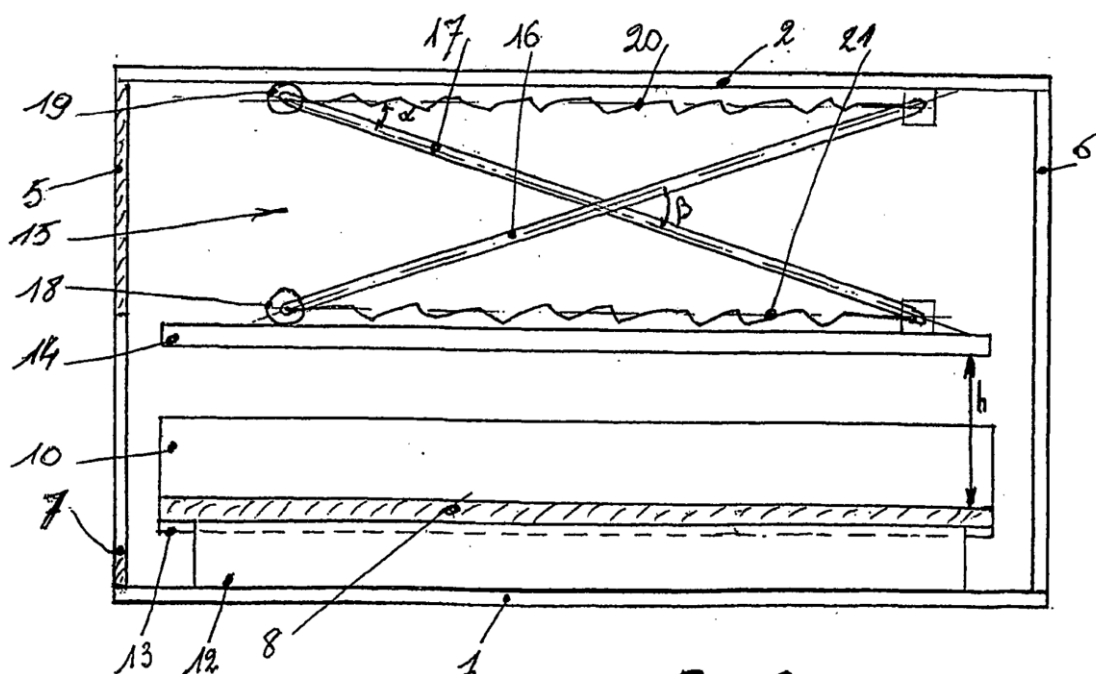
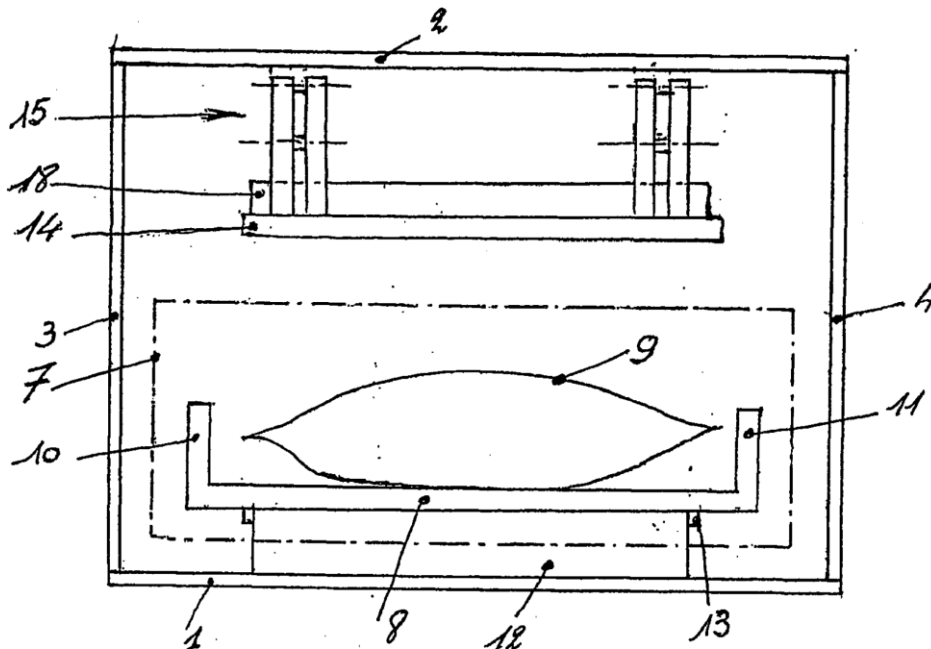
The elastic mechanism 15 is first brought to the raised position by a suitable control means. The effect of this movement is to disengage the lower plate 8, close the angle formed by the intersecting levers 16, 17 and tension the springs 20, 21. The elastic mechanism 15 is locked in the raised position by the hook 22. The lower plate 8 is then moved into the loading position (FIG. 3) and an infusion bag 9 is placed on it. The lower plate 8 is pushed back into the working position. With the aid of the rod 24 and the elastic blade 25, the elastic mechanism 15 is unlocked, and said elastic mechanism 15 applies the upper plate 14 onto the bag 9 under the effect of the traction force exerted by the springs 20, 21. The angle of the intersecting levers 16, 17 opens. The upper plate 14 thus exerts a pressure on the infusion bag 9, and this causes the expulsion of the infusion liquid from the bag towards the infusion line (not shown here).

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**DOCUMENT D1 (PRIOR ART) – US 2004/0026448 (4/5)**

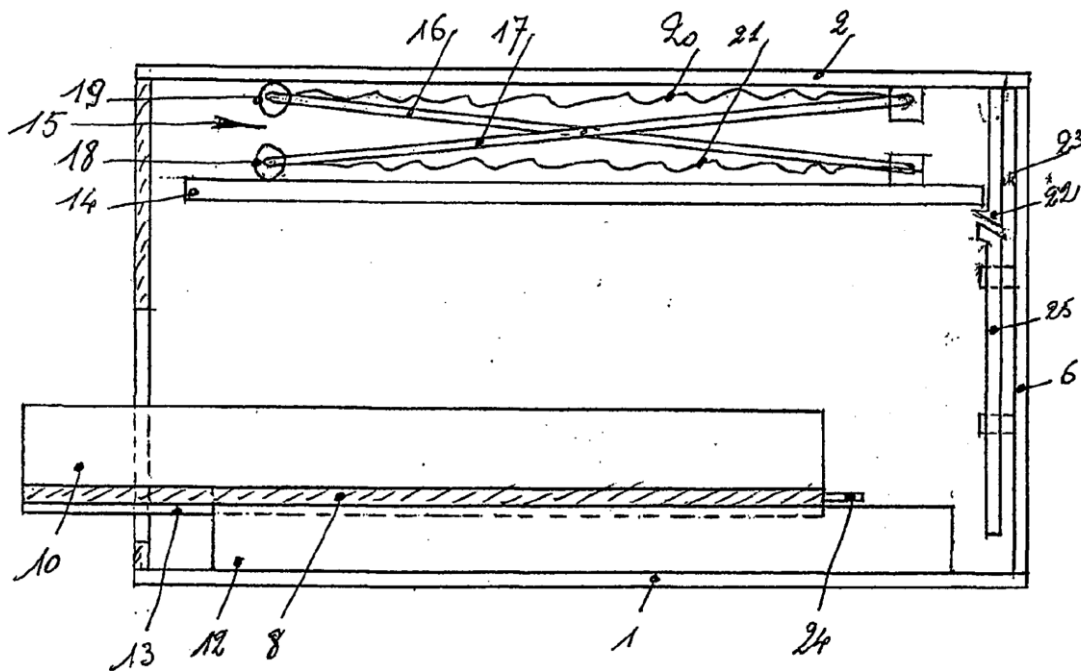


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**DOCUMENT D1 (PRIOR ART) – US 2004/0026448 (5/5)**



**Fig. 3**

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**DOCUMENT D2 (PRIOR ART) – JP 64-9187 (1/2)**

Publication number: 64-009187

Date of publication of application: 12.01.1989

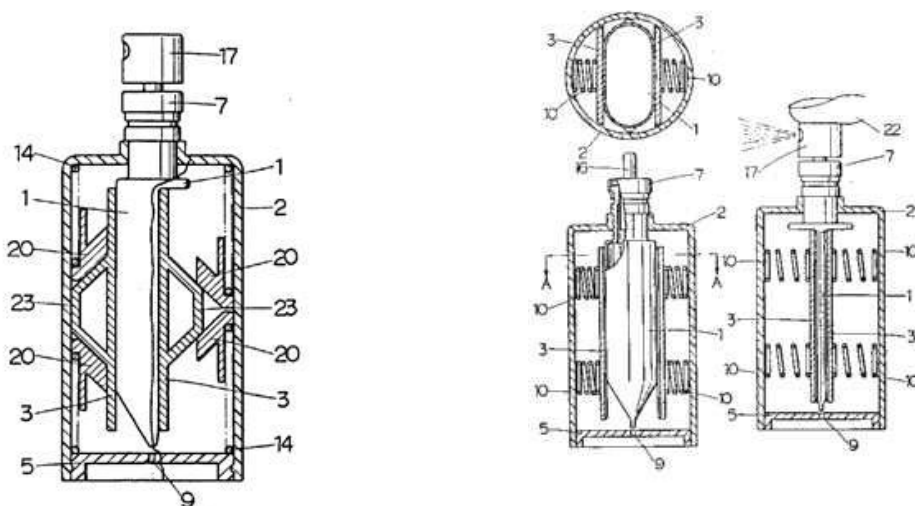
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Int. Cl. B65D 83/00

10 Application number: 62-166063 Applicant: KONDO HIROSHI  
Date of filing: 01-07-1987 Inventor: KONDO HIROSHI

**PRESSURE ACCUMULATION TYPE DISTRIBUTION APPARATUS**

PURPOSE: To release contents from a container by pressing the side surface of a bag body filled with content.



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**DOCUMENT D2 (PRIOR ART) – JP 64-9187 (2/2)**

CONSTITUTION: A bag 1 is provided in a container 2. Press plates 3 and compression springs 10 are arranged in opposed relationship so as to grasp both side surface of the bag 1. The compression springs 10 apply pressure on the bag 1. Content is allowed to fill the bag body from the stem 16 of a valve 7 under pressure exceeding the compressive forces of the compression springs 10. To release the contents, an actuator 17 is mounted to the a stem and is pushed by a finger 22 to open the valve 7.

In an embodiment of the invention, the container may comprises block members 20 and wedges 23 to press plates 3 that are arranged in opposed relationship so as to grasp both side surfaces of the bag 1.

**End**