



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**13.02.2019 Bulletin 2019/07**

(51) Int Cl.:  
**B67D 7/02 (2010.01) B67D 1/04 (2006.01)**

(21) Application number: **18188667.2**

(22) Date of filing: **13.08.2018**

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB  
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO  
PL PT RO RS SE SI SK SM TR**  
Designated Extension States:  
**BA ME**  
Designated Validation States:  
**KH MA MD TN**

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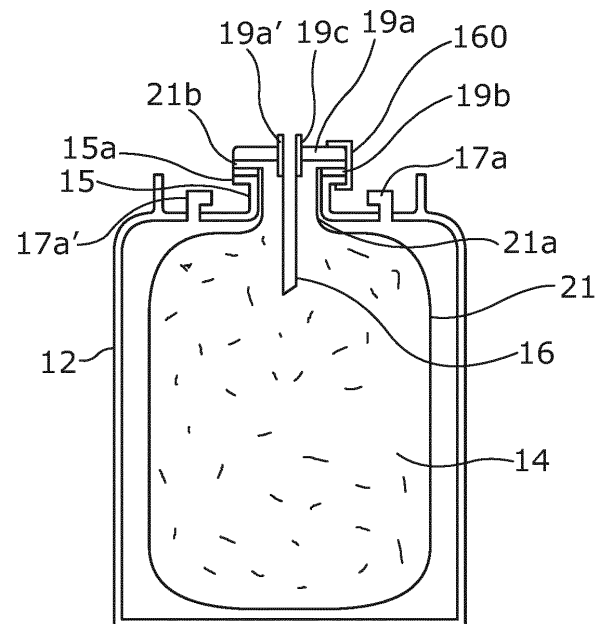
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(30) Priority: **11.08.2017 US 201715675687  
27.11.2017 GB 201719690**

(54) **IMPROVED FLUID DISPENSING APPARATUS**

(57) The combination of a container (12) of a first volume and a fluid containment and dispensing apparatus includes a flexible bag (21) having an inner wall, an outer wall and a collar. The collar comprises a plurality of components, including a collar body (15a), a flange (21b) that is attached to the bag (21), and a top plate (19a) having a first aperture therein configured for connection to a first fluid carrying conduit (19c). The fluid carrying conduit (19c) provides for egress of fluid to and from the bag (21), and the container (12) comprises walls having inner and outer surfaces. The collar body (15a) extends from a wall of the container (12), the container providing at least one second aperture (17a) configured to attach to a second fluid carrying conduit, the second fluid carrying conduit providing for ingress and egress of fluid to and from a space situated between the outer surface of the bag (21) and the inner surface of the container (12), the apparatus further comprising fastening means (150) to fasten the collar components together.



**Figure 1a**

## Description

### Field of the Invention

[0001] The invention relates to fluid dispensing apparatus and in particular to fluid dispensing apparatus for dispensing beverages.

### Background of the Invention

[0002] Many fluids which are dispensed need to be kept fresh. There are numerous methods of keeping fluids fresh, one such method being to minimise the contact of the fluid with air.

[0003] The applicant's patent application published under number WO2014/057243 describes an apparatus for dispensing liquids from a bag or liner that is situated within a container such as a barrel. A collar is provided which comprises first and second apertures, one of the apertures providing for ingress and egress of fluid to and from the bag and the other providing for egress and ingress of fluid from and to the space between an outer surface of the bag and an inner surface of the liner.

[0004] Whilst the apparatus of WO2014/057243 functions as it would be expected to do, it has been found that in some applications there is a preference to fill the bag at a faster rate than is permitted by the aforesaid apparatus.

[0005] It would therefore be desirable to provide an improved fluid dispensing apparatus.

### Summary of the Invention

[0006] According to a first aspect of the invention there is provided the combination of a container of a first volume and a fluid containment and dispensing apparatus including a flexible bag having an inner wall, an outer wall and a collar, the collar comprising a plurality of components, including a collar body, a flange that is attached to the bag, and a top plate having a first aperture therein configured for connection to a first fluid carrying conduit, the fluid carrying conduit providing for egress of fluid to and from the bag, wherein the container comprises walls the walls having inner and outer surfaces, wherein the collar body extends from a wall of the container, the container providing at least one second aperture configured to attach to a second fluid carrying conduit, the second fluid carrying conduit providing for ingress and egress of fluid to and from a space situated between the outer surface of the bag and the inner surface of the container, the apparatus further comprising fastening means to fasten the collar components together.

[0007] The fluid carrying conduit may provide for the ingress of fluid into the bag.

[0008] The at least one second aperture may be configured to attach to a second fluid carrying conduit configured to carry said fluid engrossing and egressing from the space situated between the outer surface of the bag

and the inner surface of the container.

[0009] The collar body may include a flange, the top plate aligned with the flange and fastened thereto by the fastening means.

[0010] The fastening means may be a clamp.

[0011] The clamp may comprise two elements each having a first end and a second end, wherein the first ends are pivotally connected to one another and wherein the second ends are releasably connectable to one another by a releasable fastener.

[0012] Preferably, one of the second ends has an externally threaded rod attached thereto and the other includes a recess configured to receive the threaded rod, the threaded rod having an internally threaded nut.

[0013] Advantageously, the clamp is C-shaped in cross-section comprising upper and lower walls extending from a connecting rear wall.

[0014] Preferably, the dimension extending between the internal surfaces of the upper and lower wall decreases towards the rear wall.

[0015] The at least one second aperture may be situated in the same wall of the container from which the collar body extends.

[0016] It is preferred that the combination comprises two second apertures.

[0017] The two second apertures may be situated in the same wall of the container from which the collar body extends to opposing sides of the collar body.

[0018] The combination may further comprise a down pipe which extends from the first aperture towards a bottom wall of the container terminating a small distance away from the inner surface of the bottom wall.

[0019] A cylindrical and hollow boss may extend the first aperture formed in the top plate in a direction perpendicular to the plane of the top plate.

[0020] The boss may extend away from the container.

[0021] The boss may extend towards the container.

[0022] The boss may provide for attachment of the fluid carrying conduit and the down pipe to the top plate in alignment with and for the passage of fluid through the first aperture.

[0023] The combination may further comprise a source of compressed fluid, a conduit connected to the said source of compressed fluid and to the second aperture and extending therebetween.

[0024] The combination may further comprise a multi-position valve, the valve providing in one position fluid pathway from the source of compressed fluid through the second aperture to the space between the outer surface of the bag and the inner surface of the container, and in a second position a fluid pathway from the space between the outer surface of the bag and the inner surface of the container to atmosphere. Where more than one second aperture is provided each may be provided with such a multi-position valve.

[0025] The combination of any preceding claim, further comprising a pump in fluid communication with the first fluid carrying conduit, the pump configured to cause

egress of fluid from the bag via said first fluid carrying conduit.

**[0026]** According to a second aspect of the invention there is provided a method of containing fluid in and dispensing fluid from a vessel comprising the steps of:

introducing fluid into the flexible bag of the combination of Claim 1 via the first aperture;  
allowing fluid situated in the space between the outer surface of the bag and the inner surface of the container to egress via the at least one second aperture;  
and dispensing fluid from the flexible bag through the first aperture by introducing through the second aperture fluid under pressure into the space between the outer surface of the flexible bag and the inner surface of the container.

### Brief Description of the Drawings

**[0027]** In the Drawings, which illustrate preferred embodiments of the invention, and are by way of example:

Figure 1a is a schematic cross-sectional representation of another embodiment of the invention;  
Figure 1b is a schematic plan view of a clamp of the embodiment illustrated in Figure 1a;  
Figure 1c is a side view of a component of the clamp illustrated in Figure 1b;  
Figure 1d is schematic cross-sectional view of the part of the clamp illustrated in Figure 1b on the axis a-a;  
Figure 1e is an exploded view of components of the embodiment illustrated in Figure 1a; and  
Figure 1f illustrates an alternative embodiment of the invention.

### Detailed Description of the Preferred Embodiments

**[0028]** Figure 1a illustrates an embodiment of the invention which includes fluid conduits 17, 17a which provide for the ingress and egress of fluid from between the outer wall of the liner bag 21 and the inner wall of the container (which in the illustrated embodiment is a pressure vessel) 12 is situated in a wall of the container. The container includes a collar 15 which mounts the fluid conduit 19c through which the content 14 is introduced into and forced out of the liner bag 21.

**[0029]** The container 12 includes ports 17a, 17a' in a top wall 12a of the container 12 to each side of collar 15 which is an integral part of the top wall 12a. The collar 15 includes a flange 15a extending in a substantially perpendicular direction to the collar 15. A seal 19b sits on top of the flange 15a, the seal 19b being formed of a compressible material such as rubber. The liner bag 21 has a neck 21a which terminates at a liner bag flange 21b. The liner bag flange 21b is of substantially the same shape and dimension (in the example substantially the same external diameter and substantially the same or

marginally smaller internal diameter) as the flange 15 and the seal 19b. Atop plate 19a includes an aperture 19a'. The conduit 19c is mounted on the top plate in alignment with the aperture 19a'. The top plate 19a sits on top of the liner bag flange 21b. The top plate 19a, the bag liner flange 21b (and hence the liner bag 21) and the seal 19b are secured in place on the flange 15a to make a fluid tight seal by means of a clamp 150.

**[0030]** As shown in Figure 1e, a valve 160 is attached to the fluid conduit 19c, the valve 160 comprising a valve actuator 161 a coupling 162 for connection to a pipe and a coupling 163 for connection to the fluid conduit. Moving the valve actuator 161 permits or prevents the flow of fluid through the fluid conduit 19c.

**[0031]** The clamp 150 is illustrated in Figure 1b to 1e and comprises two curved elements 151, attached together at one end by a connector element 152. The connector element 152 mounts pivot pins 153 at each end thereof, with one of the curved elements 151 being attached to a respective one of the pivot pins 153. One of the curved elements 151 has a free end 151a to which is attached a threaded rod 155 by means of a pivot pin 156. When the threaded rod 155 is rotated in the direction of the arrow x the rod 155 passes into a slot 151c in the free end 151b of the other curved element 151. With the threaded rod 155 positioned in the recess 151c, when an internally threaded nut 157 is rotated about the threaded rod 155 the nut 157 moves towards the curved element 151b tightening the clamp 150 onto the flange 15a, the top plate 19a and the components therebetween.

**[0032]** As can be best seen from Figures 1a and 1d, the curved elements 151 are substantially C-shaped in cross-section, with the inner faces 158, 158' set at a small angle  $\alpha$  to an axis y-y that is parallel with the upper/lower face 159, 159' of the curved element 151. As the two curved elements 151 of the clamp 150 are tightened on to the components therebetween, the force compress the said components increases.

**[0033]** To fill the liner bag 21 a hose is connected to the conduit 19c. Fluid passes through the conduit 19c and through a down pipe 16 into the liner bag 21. The conduit 19c is attached to the aperture 19a' with the down pipe 16 being attached to the conduit 19c. Prior to introducing fluid into the liner bag 21, one or both of the ports 17a, 17a' are set to open so that air occupying the space between the liner bag 21 and the inner face of the container 12 may be vented, typically to atmosphere (opening both ports 17a, 17a' permits more rapid egress of air from the space formed between the inner wall of the container and the outer wall of the liner bag 21). Alternatively, fluid may be introduced directly into the liner bag 21 with the top plate 19a removed. This allows for faster filling than filling through the conduit 19c and conduit 16. The liner bag 21 may be filled partially or completely prior to attachment of the top plate and associated conduit 19c and down pipe 16. Where the liner bag 21 is only partially filled and it is desired to fill the liner bag completely, filling thereof may be completed in the manner first described.

**[0034]** To empty the liner bag 21 the conduit 19c is connected to a selected outlet, for example a dispense tap or gun. One or both of the ports 17a and 17a' are connected to a source of pressurised fluid, for example pressurised air. The flow of pressurised air through the ports 17a, 17a' is controlled by a valve and/or the operation of an air compressor. When pressurised fluid is let through the ports 17a, 17a' the content 14 of the liner bag 21 is forced out via the down pipe 16. In the case where only one of the ports 17a, 17a' is connected to a source of pressurised fluid the other of the ports is closed.

**[0035]** The presence of two ports 17a, 17a' provide for fast and even filling of the liner bag.

**[0036]** 1f illustrates an alternative embodiment of the invention in which the down pipe 16 is connect to a pump 200. The pump 200 is configured as a suction pump. When activated, the pump 200 draws fluid 14 from the liner bag 21 via the down pipe 16. Fluid is pump via an outlet conduit 201 to a desired location. When the pump is activated the ports 17a, 17b are open (they may be open permanently) to allow gas to enter the space between the inner wall of the container 12 and the outer wall of the liner bag 21.

## Claims

1. The combination of a container of a first volume and a fluid containment and dispensing apparatus including a flexible bag having an inner wall, an outer wall and a collar, the collar comprising a plurality of components, including a collar body, a flange that is attached to the bag, and a top plate having a first aperture therein configured for connection to a first fluid carrying conduit, the fluid carrying conduit providing for egress of fluid to and from the bag, wherein the container comprises walls the walls having inner and outer surfaces, wherein the collar body extends from a wall of the container, the container providing at least one second aperture configured to attach to a second fluid carrying conduit, the second fluid carrying conduit providing for ingress and egress of fluid to and from a space situated between the outer surface of the bag and the inner surface of the container, the apparatus further comprising fastening means to fasten the collar components together.
2. The combination of Claim 1, wherein the fluid carrying conduit provides for the ingress of fluid into the bag.
3. The combination of Claim 1 or 2, wherein the at least one second aperture is configured to attach to a second fluid carrying conduit configured to carry said fluid ingressing and egressing from the space situated between the outer surface of the bag and the inner surface of the container.

4. The combination of any preceding claim, wherein the collar body includes a flange, the top plate aligned with the flange and fastened thereto by the fastening means.

5. The combination of any preceding claim, wherein:

the fastening means is a clamp;

or

the fastening means is a clamp and the clamp comprises two elements each having a first end and a second end, wherein the first ends are pivotally connected to one another and wherein the second ends are releasably connectable to one another by a releasable fastener.

6. The combination of Claim 5, wherein one of the second ends has an externally threaded rod attached thereto and the other includes a recess configured to receive the threaded rod, the threaded rod having an internally threaded nut.

7. The combination of Claim 5 or 6, wherein:

the clamp is C-shaped in cross-section comprising upper and lower walls extending from a connecting rear wall; or

the clamp is C-shaped in cross-section comprising upper and lower walls extending from a connecting rear wall and the dimension extending between the internal surfaces of the upper and lower wall decreases towards the rear wall .

8. The combination of any preceding claim, wherein the at least one second aperture is situated in the same wall of the container from which the collar body extends.

9. The combination of any preceding claim, wherein:

the combination comprises two second apertures;

or

the combination comprises two second apertures and the two second apertures are situated in the same wall of the container from which the collar body extends to opposing sides of the collar body.

10. The combination of any preceding claim, further comprising a down pipe which extends from the first aperture towards a bottom wall of the container terminating a small distance away from the inner surface of the bottom wall.

11. The combination of any preceding, wherein:

a cylindrical and hollow boss extends the first

aperture formed in the top plate in a direction perpendicular to the plane of the top plate;  
or  
a cylindrical and hollow boss extends the first aperture formed in the top plate in a direction perpendicular to the plane of the top plate and the boss extends towards and/or away from the container.

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12. The combination of Claim 11, wherein the boss provides for attachment of the fluid carrying conduit and the down pipe to the top plate in alignment with and for the passage of fluid through the first aperture.

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13. The combination of any preceding claim, further comprising:

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a source of compressed fluid, a conduit connected to the said source of compressed fluid and to the second aperture and extending therebetween;

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or

a source of compressed fluid, a conduit connected to the said source of compressed fluid and to the second aperture and extending therebetween and a multi-position valve, the valve providing in one position fluid pathway from the source of compressed fluid through the second aperture to the space between the outer surface of the bag and the inner surface of the container, and in a second position a fluid pathway from the space between the outer surface of the bag and the inner surface of the container to a atmosphere.

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14. The combination of any preceding claim, further comprising a pump in fluid communication with the first fluid carrying conduit, the pump configured to cause egress of fluid from the bag via said first fluid carrying conduit.

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15. A method of containing fluid in and dispensing fluid from a vessel comprising the steps of:

introducing fluid into the flexible bag of the combination of any of Claims 1 to 14 via the first aperture;  
allowing fluid situated in the space between the outer surface of the bag and the inner surface of the container to egress via the at least one second aperture;  
and dispensing fluid from the flexible bag through the first aperture by introducing through the second aperture fluid under pressure into the space between the outer surface of the flexible bag and the inner surface of the container.

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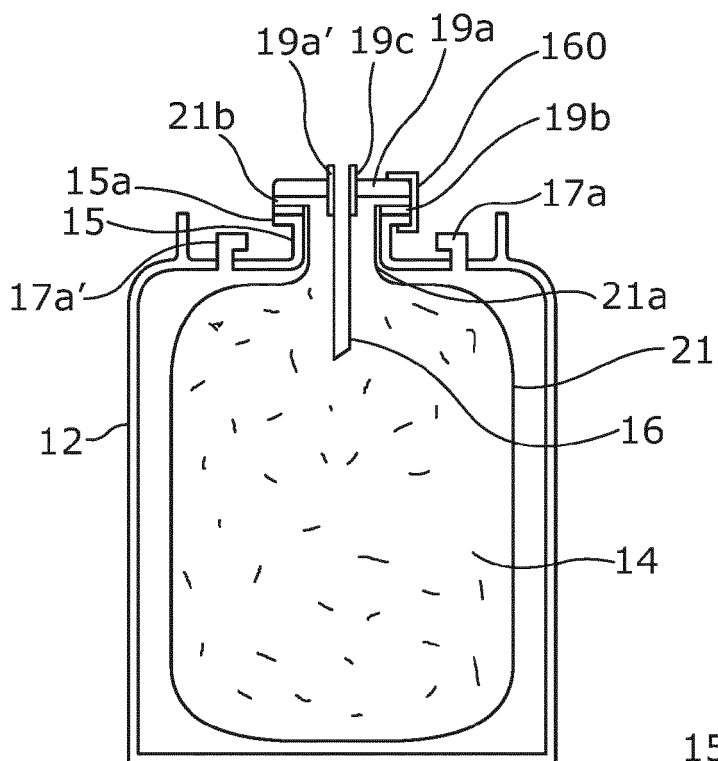


Figure 1a

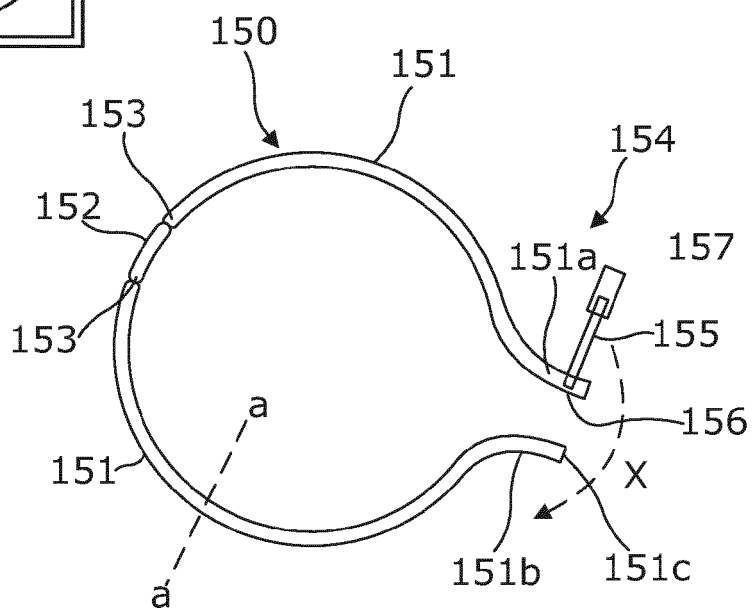


Figure 1b

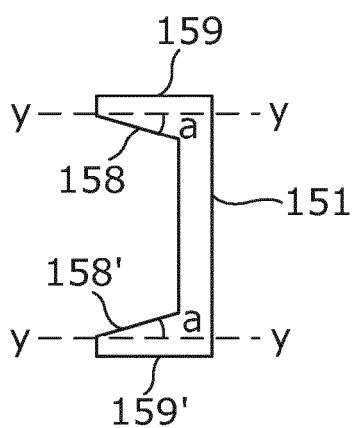


Figure 1d



Figure 1c

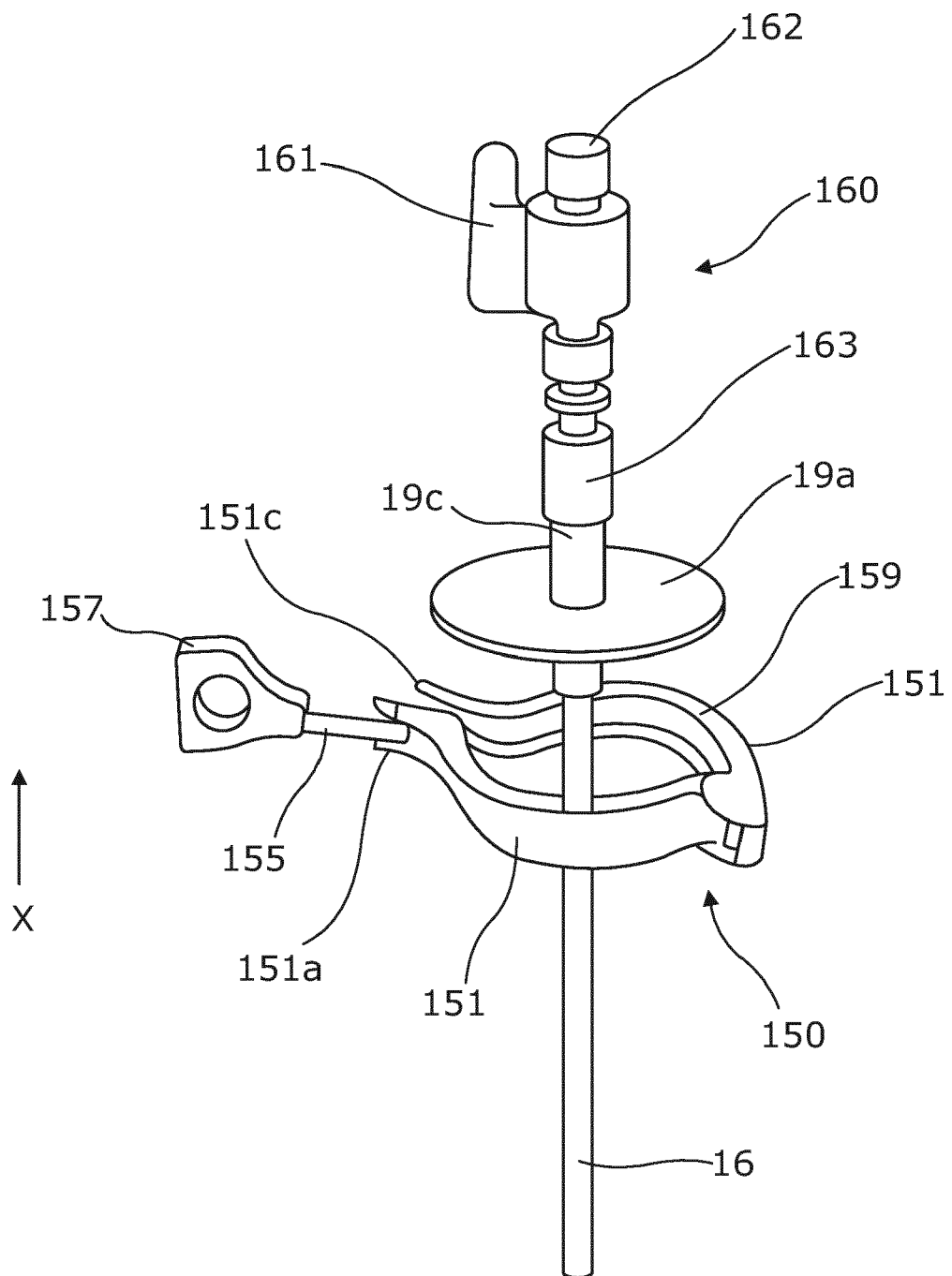


Figure 1e

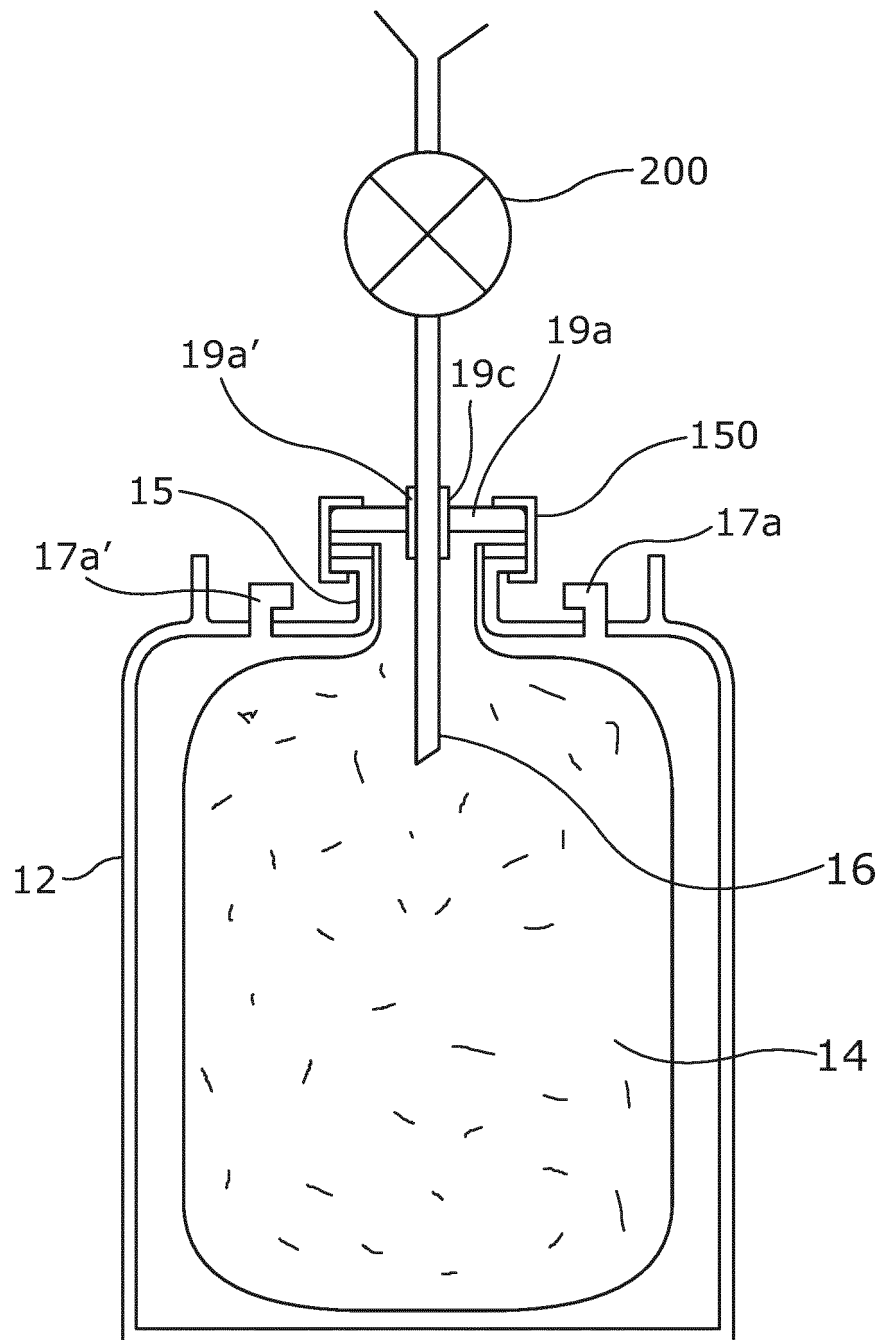


Figure 1f





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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                    |                                                                                                                                                                                       |                                                                                                                                                                                                                                                                              |                                         |
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| The present search report has been drawn up for all claims                                                                                                                                                                                             |                                                                                                                                                                                       |                                                                                                                                                                                                                                                                              |                                         |
| Place of search<br><b>Munich</b>                                                                                                                                                                                                                       |                                                                                                                                                                                       | Date of completion of the search<br><b>20 November 2018</b>                                                                                                                                                                                                                  | Examiner<br><b>Schultz, Tom</b>         |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document |                                                                                                                                                                                       | T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                         |

**ANNEX TO THE EUROPEAN SEARCH REPORT  
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