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(71)(72) Applicant and Inventor: BJØRN, Per, Ole [NO/NO]; P.O. Box 2132, N-9002 Tromsø (NO).

(74) Agent: ONSAGERS PATENTKONTOR A.S; P.O. Box 265 Sentrum, N-0103 Oslo (NO).

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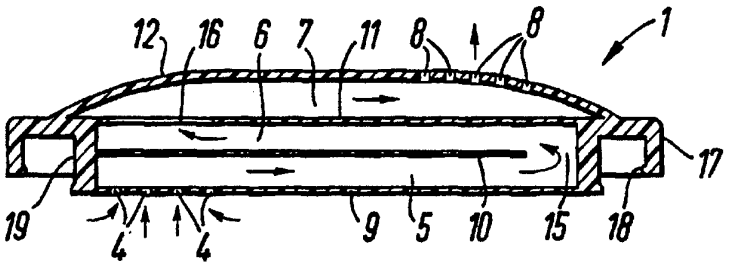

(57) Abstract

The invention relates to a multi-compartment valve device with parallel walls and gas inlet, division plate walls and gas outlet located in such mutual distance from one another, that when the valve device is filled with a deodorizing material, the contact area between the gas and the absorbing means is maximal in regard to the capacity, and the valve device is further filled with a substrate which expands or swells on exposure to moisture, which is located in at least one compartment downstreams of the compartment(s) with the odour-absorbing means.

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A valve device for absorption of the gas components

The invention concerns a valve device or filter house which can be used, for example, in stoma bags, especially ileostomy bags, which in one embodiment have an extended gas transport path, and which are self-closing when the moisture in the filter exceeds a certain limit. The invention also concerns a pouch containing said valve device.

Surgical procedures such as colostomy, ileostomy and urostomy, where a permanent opening is created between the body's internal cavity and the environment, apart from the natural orifices, makes it necessary for the patient to permanently wear a bag for the collection of bodily fluid, possibly faeces and faecal particles. This is necessary because the body's natural orifices have shut-off musculature, such as sphincter musculature, which is subject to voluntary control, while a surgical stoma will directly discharge bowel contents/urine without the person having very much control over the process. The composition of the discharges in the case of bowel stomata will be dependent on at which point in the intestine the operation was performed, so that, e.g., in the case of a colostomy the discharge will be of a thicker, almost normal consistency, since a part of the water reabsorption capacity will be intact, while in the case of ileostomy the discharge will include particles of different sizes in a thin liquid. In both cases intestinal gas, which is formed continuously in amounts from 50-1200 ml per day, measured as the amount which passes through the anus, will be passed out into the bag together with the bowel contents. Thus in the case of stomata, a considerable amount of gas could be passed out into the bag every day.

Intestinal gas or flatus (intestinal gas which emerges through the anus) contains nitrogen, carbon dioxide, hydrogen, methane and trace elements in varying amounts. Compositions have been measured (Kodama and Miura, J.Japan Soc. Nutr. 2:149-152, 1949) such as 13-34% CO_2, 19-26% CH_4, 20-27% H_2, 17-48% N_2 and less than 1% of indole, skatol, volatile amines and hydrogen sulphide. The latter constitute the malodorous substances in flatus and it is claimed that H_2S can be detected by the sense of smell in as low a concentration as one part H_2S in 100 million (0.01 dpm). Thus a bad smell can constitute a substantial disadvantage when wearing a stoma bag.

Since substantial amounts of malodorous intestinal gas can thus be produced and passed out into a stoma bag, this bag would rapidly become inflated if it was not

provided with an outlet valve, and due to the smell this valve also requires a filter which removes odour by absorption, as it contains a deodorant material. A filter of this kind has to provide a sufficient contact area between the odour-absorbing material and the gas for adequate absorption of the odour, and the filter must be able to prevent or reduce the formation of moisture in the filter because a moist filter does not absorb gas. In the case of ileostomies, the build-up of moisture in the filter constitutes a particularly serious problem compared with colostomy, since the discharge is mainly liquid. Thus during the night it is difficult to avoid exposing the filter to liquid.

Attempts have been made to solve these problems in a number of patents, such as NO-PS 139029, 154904, 161293, SE-PS 454239 and DE-PS 3036009 which are hereby included as references.

The prior art comprises the use of active carbon in the filter device with various designs for extending the gas flow path in the filter, such as the case in which the valve device constitutes a plug where the gas circulates in winding channels formed in the actual filter or where the valve device has standing walls which force the gas to circulate on a plane parallel to the valve device's outer top, which is parallel to the bag's surface and thereby increases the gas flow path approximately five times (NO-PS 139029), or where the filter is oblong with an inlet opening for gas and an outlet opening near each end (NO-PS 161293) or where the filter is composed of a gas channel round the periphery of the related stoma bag (NO-PS 154904). The most common filter available on the market, which is based on SE-PS 454239, permits the gas to flow through the thickness of the filter and includes no other modification for extending the gas flow path through the filter than that the gas enters the centre of the filter, through an opening which is substantially smaller than the radius of the filter and smaller than the gas outlet opening from the filter, the transport path thus passing obliquely through the filter and thereby being extended. A filter of this kind can, e.g., be 20 mm in diameter, with a thickness of 2 mm and the transport path will be approximately 10 mm.

Further factors which reduce the capacity of the filter are the production of channels in the filter mass, during which process the active carbon is removed from the walls or show lacking cohesion in the middle of the filter mass and falls apart. The gas will follow the path of least resistance and will not be forced to circulate the whole filter mass, and the absorption capacity is reduced.

This problem is tried solved in DK-B2-147 293, in which the diffusion path for the gases is no longer than the from the periphery ofthe filter to the centre. However, the filter material consists of a special cotton matrix in which a great amount of fine granulated active carbon is embedded, enveloped by a gas-proof plastic dispersion. This gives a good cohesion in the finely granulated carbon, and the plastic dispersion penetrates the filter mass on several places and anchor the two layers to each other. Consequently the filter mass does not loosen from the walls, and the particles will not fall apart. The gas is thereby forced through the whole of the gas-absorbing mass.

A common problem for all filters included in the prior art is, however, as mentioned above, that when the filter becomes moist the filter mass's odour absorption is reduced or ceases, thus allowing malodorous intestinal gas to be released into the environment. This is a serious problem for patients who are obliged to wear a stoma bag permanently.

Attempts have been made to solve this problem in the prior art by placing a barrier layer of gas-permeable but moisture-impermeable material on the gas inlet side of the filter (NO-PS 161293, NO-PS 139029, DE-PS 3036009). However, this or these hydrophobic layers can cause a blockage problem, the passage of gas in the moisture-inhibiting layer being reduced or obstructed when particles and more solid contents of the bowel discharge cover the filter surface and reduce the through-flow of gas. Especially in connection with ileostomi the content of solid particles is considerable.

Thus it is the object of the present invention to provide pouch with a valve device with filter which gives a larger effective exposure surface between the gas and the gas component absorbing material than filters which are included in the prior art, is especially suitable for, for example ileostomies, in that the gas flow is stopped by the channel being closed when the filter becomes moist and inflation of the bag signals that the filter/bag must be changed.

These objects are achieved by the present invention characterized by the features in the claims presented.

The present invention comprises pouch with a valve device 1 which can be attached to a valve opening 2 in, e.g., a stoma bag by means of a known reversible, rapid lock technique or can be permanently welded to the bag or be

an integrated part of the bag in that the wall of the bag serves as one of the valve walls. The valve device is round or oblong, with or without rounded ends viewed in a plane parallel to the wall 14 of the bag, and consists of a number of compartments, for example three compartments, 5, 6 and 7, defined by the device's bottom 9, lower division plate 10, upper division plate 11 and top 12, all with openings 4, 15, 16 and 8 for gas through-flow, where the two lowest compartments 5 and 6 are filled with an odour-absorbing means, and the upper compartment is filled with a means which expands when it becomes moist. In a second design the valve device consists of two compartments 24, 25 with inlet openings 26 and outlet openings 27 localized in the periphery of the valve and opening 29 in the centre of the intermediate wall 23. The lower compartment 24, the gas absorption compartment, is filled with gas-absorbing means and the upper compartment, the expansion compartment, is filled with a means which expands when moist. This means can be in powder form or in the form of a body.

The different versions of the invention will now be described in detail with reference to the figures, where

fig. 1 illustrates (a) the valve device viewed from the gas outlet side, (b) a cross section along the valve device's longest axis (line 3-3' in fig. 1a) and (c) the valve device viewed from the gas inlet side;

fig. 2 illustrates a section of the valve device through line 20-20' in fig. 1 and demonstrates the possibilities for attaching the device to a stoma bag, either a reversible rapid lock (a) or permanently welded into the stoma bag (b);

fig. 3a, b illustrates a test apparatus for testing an expanding substance's ability to stop the through-flow of gas under the influence of moisture. A is active carbon, B is the expanding substance during testing and C is a partition of gas. Panel b shows the filter cylinder with attached balloon, filled with air and water, and

fig. 4a and b illustrate a second design of the invention with two compartments and granulated active carbon-impregnated foam as gas absorption means.

Fig. 1 illustrates a version of the valve device according to the present invention, consisting of three adjacent compartments 5, 6 and 7, where the gas enters the

valve device through a perforated opening 4 on the end of the device in the bottom 9, circulates from compartment 5 to compartment 6 through an opening 15 in the lower division plate 10 at the valve device's opposite end, circulates back and into compartment 7 through an opening 16, located in the upper division plate 11 at the first end, immediately above the gas inlet 4, and the gas flows on into compartment 7 towards the valve device's other end and leaves the valve device through gas outlet 8, located near the other end. In a round arrangement of the valve device the openings are located with mutual maximum distance between each opening. A flange 17 round the valve device is designed with a turned down outer part, provided with a projection 18 pointing towards the valve device and thus coming into engagement with a projection directed from the valve device aperture on a collar round the stoma bag opening (fig. 3a). This attaching mechanism, which is reversible, can be found, e.g., on stoma bags produced by ConvaTec and is known in the prior art. In another version the valve device is equipped with a single flange around the periphery which is used when the valve device is permanently welded to the bag by means of the prior art (fig. 3b).

The valve device is made of a suitable material which does not react chemically with the filter contents. In a preferred embodiment the device is made of a suitable platic material.

The lower division plate 10 which separates compartments 5 and 6 is parallel to the bottom 9 and upper division plate 11 and located in such a manner that the heights in compartments 5 and 6 are the same. Opening 15 is located at the other end, opposite the gas inlet 4. Opening 16 is located at the first end opposite opening 15 and this gives a substantially extended diffusion path while at the same time the gas comes into contact with the odour-absorbing means over the entire width of the valve device. This constitutes a profoundly enlarged contact surface compensating for possible creation of channels in the odour-absorbing mass, with a considerably larger surface than that to which the gases are exposed in, e.g., NO-PS 139029, where the gas circulates in channels formed in the odour-absorbing medium or in channels formed in perpendicular walls in the filter device. The odour-absorbing means can comprise active carbon, another deodorant means or a means which itself has a smell or a mixture of these means.

In the upper compartment 7, defined by the upper division plate 11 and the top 12, there is filled a medium which is porous and gas permeable when dry, but which swells under the influence of moisture and closes the gas outlet. Suitable means can include powderous plaster, sand or a a powder mixture of plaster and sand in suitable proportions in the region of 30:70 to 70:30 (plaster:sand), preferably 50:50, dried and compressed synthetic sponge material or Superabsorbens, LIC, or any porous medium which swells when damp. Since compartment 7 is limited by relatively rigid walls 11, 12, the swelling will cause the gas flow to stop and no gas will be released from the bag even though the swelling stops the gas outlet through the porous medium without this being enveloped by rigid walls. The bag will then swell and this is a signal that the filter has to be changed. The valve device 1 with two filter layers and moisture-swelling mass is manufactured as a unit, replaced by a new one when the gas outlet is clogged, and discarded.

Fig. 4 a and b illustrate a second design of the valve device according to the invention. This design has a division plate 23 and is separated in a lower 24 and an upper 25 compartment. The outer walls of the valve device have a number of inlet openings 26 for gas in the wall 21 towards the interior of the stomi bag and a number of outlet openings 27 for gas in the wall 22 facing the ambience, where both sets of openings 26, 27 are located in the periphery of the valve device and such that the set of openings 26 leads the gas into the lower compartment 24 and the set of openings 27 leads the gas out of the upper compartment 25. The division plate 23 separating the two compartments 24 and 25 have an opening in the centre.

The walls 21, 22 and the division plate 23 are produced in any suitable material, for example plastic material lwhich is gas-proof and moisture-proof. In the periphery of the valve device the upper wall 22, the lower wall 24 and the division plate 23 are melted together to form a flange surrounding the whole valve device (fig. 4b). This flange can be heat sealed in a suitable opening in the stoma bag. In a second design (fig. 4a) the valve device is produced as an integrated part of the stoma bag such that the outer wall of the bag constitutes the division plate 23 and the valve device walls 21 and 22 are attached on the inside and outside, respectively, of the bag by a gas-proof sealing. In both designs the valve design is permanently attached to the stoma bag.

The lower compartment 24 is filled with a gas-absorbing substrate in a form which prevents creation of channels, for example granulated active carbon impregnated in a synthetic foam. In this foam impregnated with granulated active carbon, the carbon is attached so firmly to the pore walls that the particles do not loosen. Hence the gas will be exposed to the absorption capacity ofthe whole filter mass and the previously mentioned creation of channels is avoided.

The upper compartment 25 is filled with a material which swells or expands when moist and closes the gas outlet. Suitable means are mentioned previously.

The odorous, moist intestinal gas enters the valve device through the openings 26, passes through the odour-absorbing material which will not be canalized in the lower compartment 24, through openings 29, into the upper compartment 25 and leaves through the openings 27. Deposition of moisture in the filter material, which in the lower compartment will lead to a reduction of the odour absorption, according to the present invention will lead to swelling of the substrate in the upper compartment and closure of the gas outlet. Exposure of moisture in the form af a direct contact between the valve device and liquid in the stoma bag will produce the same effect. The stoma bag will inflate as a signal to change the valve device/bag. Even though the gas pressure in the bag increases with the accumulation of gas the closed filter remains gas-proof.

The present design of the valve device is not limited to any specific shape, and the number of division plates in the valve device can be increased such that there are several separated layers with gas-absorbing substrate, while at least one upper compartment always will contain a moisture expanding substrate.

In the following the invention will be further described and illustrated by examples.

EXAMPLE 1

A test apparatus for testing the filter mass in the valve device

The test apparatus is illustrated in fig. 4a, b and consists of a plastic cylinder, corked at both ends by perforated corks, where the downstream hole has a smaller diameter than the upstream hole. The cylinder is filled with, e.g., active carbon A, and the expanding substance B, during testing. Between the two layers there is a partition of gas C. To this filter cylinder there is fitted a bag of

elastic, airtight material such as a balloon, which is filled approximately 1/4 full of water and 3/4 full of gas or air. When the test apparatus is put into operation, supported in such a manner that the filter cylinder is vertical and points upwards, the air/gas will leak out through the filter cylinder, the balloon will collapse and the filter cylinder will come into contact with water. The moisture will be drawn up through the filter and reach the test substance B.

By compressing the balloon it can be checked whether the filter cylinder has become blocked. This test apparatus simulates the situation in which a valve device according to the present invention is inserted in a stoma bag.

EXAMPLE 2

The testing of different materials which expand under the influence of moisture

The filter cylinder was filled with active carbon as test substance A and as test substance B there was used 1) a mixture of plaster and sand (50:50, plaster/-sand), 2) dried synthetic sponge material, and 3) Superabsorbens, LIC. The balloon was filled with air and water as described in example 1.

In all three cases the through-flow of air was stopped when the moisture reached the test substance B in the filter cylinder.

In all three cases the balloon was thereafter disconnected and the impermeability of the filter cylinder to the through-flow of gas was tested with air under a pressure of 6 bar. The filter cylinder did not allow air to pass through in any of the three cases.

EXAMPLE 3

Testing of the second valve device design according to the invention with ileostomi bag

The example shows a testing of ileostomi bags with the second design of the valve device according to the invention, in which the lower compartment 24 is filled with a synthetic foam impregnated with granulated active carbon, and the upper compartment 25 is filled with Superabsorbens, LIC. The test continues over six days, and in the beginning of the period intake of food and liquid which is known to produce air in the gastrointestinal tract was emphasized. This intake

is specified by time of the meal and the type of food consumed. No specific indication of time of meal and type of food means that normal meal rythm, comprising three bread meals and one dinner a day, was followed.

Day 1

5 p.m.	A meal comprising salmon, shrimps, beer and champagne was consumed.
6 p.m.	Bag 1 was attached.
9-11 p.m.	Big meat supper with wine, beer and brandy.
1.30 a.m.	Went to bed. The filter functioned all the time adequately without creation of odour.

Day 2

6.30 a.m.	Awakening. The filter iss closed and the bag is slightly inflated by gas. The typical balloon shape which is common to ileostomic bags without valve device was not observed. Bag 1 was used all through the day.
8-9 p.m.	Fish dinner with a lot of beer. Continued to use bag 1 in order to test whether an increased gas pressure in the stomic bag should open up the valve device. No reopening nor any smell was observed.
1.30 a.m.	Bag 1, which was used for 31,5 hours, was disconnected. Bag 2 was connected.

Day 3

7 a.m.	Awakening. The bag was slightly inflated, but the valve device was open. No odour was observed.
3 p.m.	The valve device was completely closed.
23.30 p.m.	The valve device was still closed. No odour was observed, and the bag worked like a common ileostomic bag without valve device. Bag 2 was disconnected. Bag 2 was used for 34 hours. Bag 3 was connected.

Day 4

The valve device in bag 3 was closed during the night. Even though the bag showed no typical balloon-shape, which would have been the case of ileostomic bags without valve device, no odour or leak from the valve device was observed. Bag 3 was used all through the day and the following night.

Day 5

9 a.m. Bag 3 was disconnected after 33,5 hours' use. No balloon-shape, no leak, no odour was observed. Bag 4 was connected. The filter in this bag remained open and functioned all through the day. No smell was observed.

6 p.m. The valve device closed. The same bag was used all through the night.

Day 6

7 a.m. Awakening. No odour was observed, nor any leak, but the bag was now shaped like a balloon. Bag 4 was disconnected after 22 hours of use.

General conclusion

The valve device according to the invention was tested in one subject during a period of 6 days, comprising a common Norwegian regime of meals in addition to some larger intake of air producing food at abnormal times of the day. The valve device worked adequately in this period, and if the bag is changed twice during 24 hours, all problems with air in the bag will be eliminated. It is especially promising that if a new bag with a valve device according to the invention is connected just before going to bed, it will last all through the night. This is a period when ileostomic bags will normally be exposed to the liquid content of the bag. Generally the valve device seems to be open longer in the day time when the subject is in a upright position, because the filter mass in this position will not easily be in contact with the liquid in the bag. When the valve device was taken apart, it was observed that only about 25% of the Superabsorbens was moist when the valve device was closed.

PATENT CLAIMS

1. Valve device containing odour-absorbing substrate, for example active carbon as powder or foam of synthetic material impregnated with granulated active carbon, between gas-proof and liquid-proof walls, and which has limited passages for gaseous substances, such constructed that when the odour-absorbing substrate is active carbon as a powder, the gas path through the valve device is prolonged, when the mentioned valve device is designed to be used in connection with stomi devices or devices for other outlet openings for waste products from the human body, comprising bags for intake and storing of the same waste products, in which the valve is designed with a flange around the periphery for permanent welding onto the bag, represents an integrated part of the bag in such a way that the wall of the bag is one of the gas-proof and moisture-proof walls in the valve device, or in which the outer part of the flange is turned down and equipped with a projection (18) in the direction of the valve device for reversible rapid locking into the bag aperture,
c h a r a c t e r i z e d in that the odour-absorbing substrate is placed in one or several mutually adjacent compartments which are separated by gas-proof and liquid-proof, parallel walls comprising passages for gaseous substances located such that the gas can circulate through all of the gas-absorbing substrate in all compartments, and that after the one or several gas-absorbing compartments there is provided at least one further downstream compartment (7, 25) filled with a substrate or a mixture of substrates expanding when exposed to moisture, so that the valve device is closed and the gas flow is stopped.

2. Valve device according to claim 1,
c h a r a c t e r i z e d in that the contact area between gas-absorbing filter mass and gas mixture is enlarged in that at least three parallel division plates are located between the top and bottom of the valve device with openings in each division plate located such that the mutual distance between the openings are maximal.

3. Valve device according to claim 1,
c h a r a c t e r i z e in that it contains two parallel compartments, of which the one, gas absorption compartment (24), is filled with active carbon attached by an adhesive means in a pore-forming matrix, and the gas-proof and liquid-proof walls are produced of a plastic material.

4. A valve device as indicated in one of the preceding claims, characterized in that the mixture of substances in the upper compartment (7, 25) is plaster, sand or plaster and sand, preferably in the proportion of from 30:70 to 70:30 (parts plaster:parts sand), 50:50 being specially preferred.

5. A valve device as indicated in one of the preceding claims, characterized in that the substance or mixture of substances in the upper compartment (7, 25) is dried sponge of a synthetic material.

6. A valve device as indicated in one of the preceding claims, characterized in that the substance or mixture of substances in the upper compartment (7, 25 is Superabsorbens, LIC.

7. A valve device as indicated in claims 1, 3, 5 and 6, characterized in that the lower compartment (24) is filled with plastic foam impregnated with granulated active carbon.

8. Use of a valve device according to claims 1-7, for absorption of odour in intestinal gas from ieostomi bags and colostomie bags and for automatic closure the valve device when this is exposed to humidity.

9. A pouch for the receipt of body waste products comprising a container having first and second walls sealed around their edges, the first wall having an orifice via which the waste products can enter the pouch, the pouch having a gas filter attached thereto disposed so that gases within the pouch pass to the exterior via the filter, the filter comprising at least a first compartment which contains an odour-absorbing substance and a second compartment having an exit aperture and being located downstream of the first compartment, in which the second compartment contains a body of a material which expands to close off the exit aperture when exposed to liquid or moisture, there being a gas flow aperture connecting the first and second compartments positioned to ensure an elongated pathway for body waste gases through the first and second compartmens.

10. A pouch according to claim 9, in which the said gas flow aperture is an aperture in the second wall of the pouch.

11. A panel according to claim 10, in which the said first compartment is

defined between an inner covering panel and the inner surface of said second wall, and the said second compartment is defined between an outer covering panel and the exterior surface of the said second wall.

12. A pouch for the receipt of body waste products comprsing a container having opposed walls sealed around their edges, one wall having an orifice via which the waste products can enter the pouch, the pouch having a gas filter attached thereto disposed so that gases within the pouch pass to the exterior via the filter, the filter comprising at least a first compartment which contains an odour-absorbing substance, e.g. activated carbon, a second compartment which also contains activated carbon, and a third compartment located downstream of the second compartment which contains a body of material which expands to close off the exit aperture when exposed to liquid or moisture, the first and second compartments being separated by a wall disposed substantially parallel to an adjacent wall of the pouch, and the pouch further having an orifice connecting the first and second compartments positioned to ensure an elongated pathway for gases through the compartments.

13. A mulit-compartment device for attachment to a pouch for the receipt of body wastes, the device compring at least two compartments the first of which contains an odour-absorbing substances and the second of which contains a material which swells upon contact with moisture, the first compartment having a gas inlet orifice whereby gas can be admitted thereto and a means of conveying said gas to the second compartment, which latter has a gas outlet blockable upon swelling of said substance, each compartment being of flat configuration.

14. A multi-compartment device according to claim 13, in which one of the pouch walls, provided with a gas flow aperture, separates the first and second compartments.

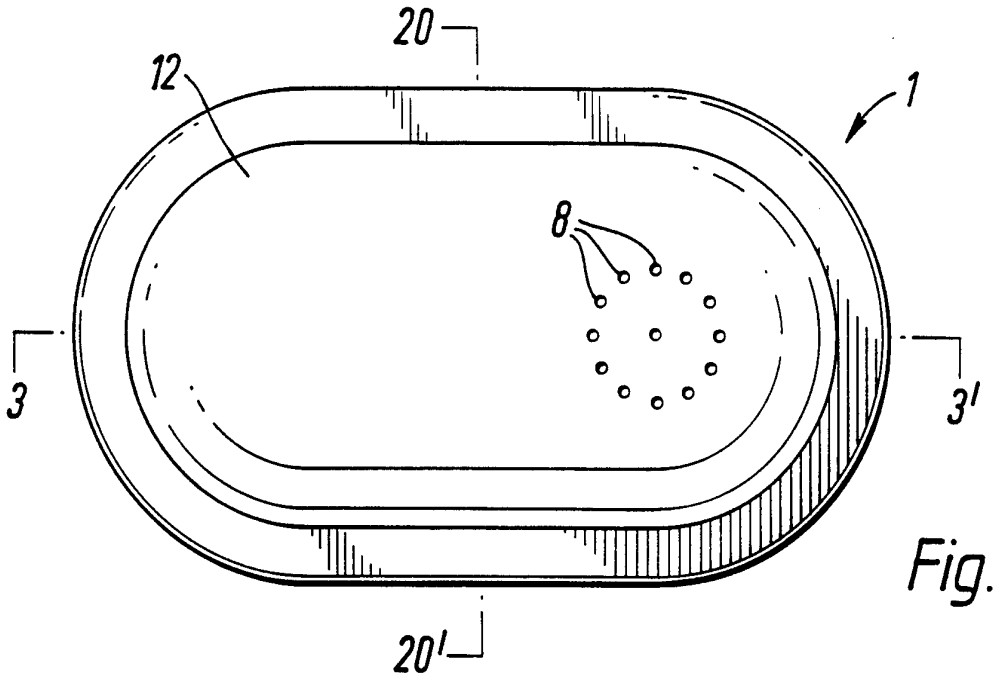

Fig. 1a

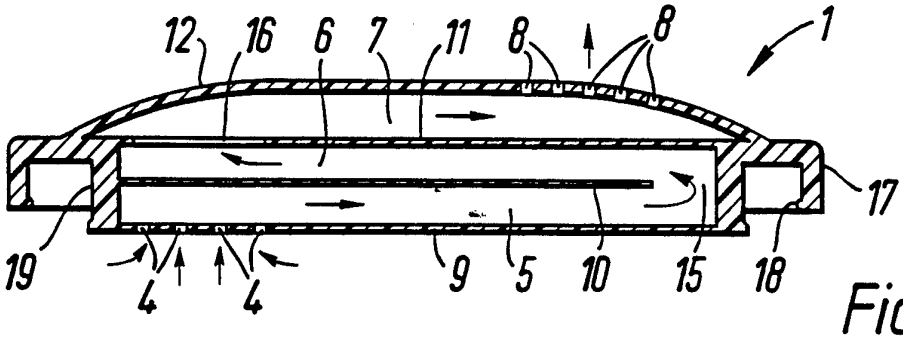

Fig. 1b

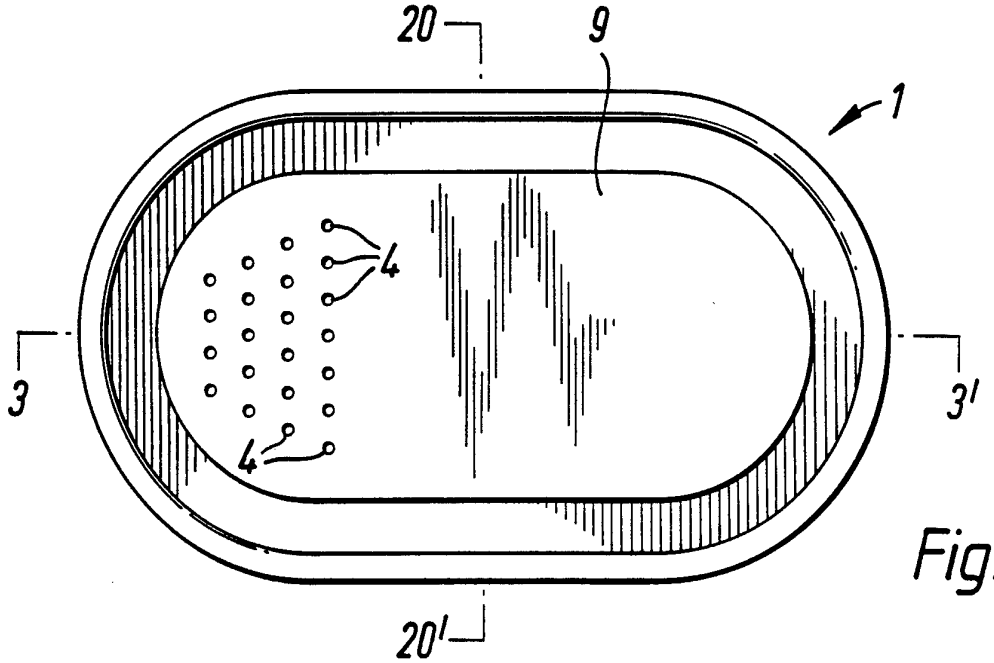

Fig. 1c

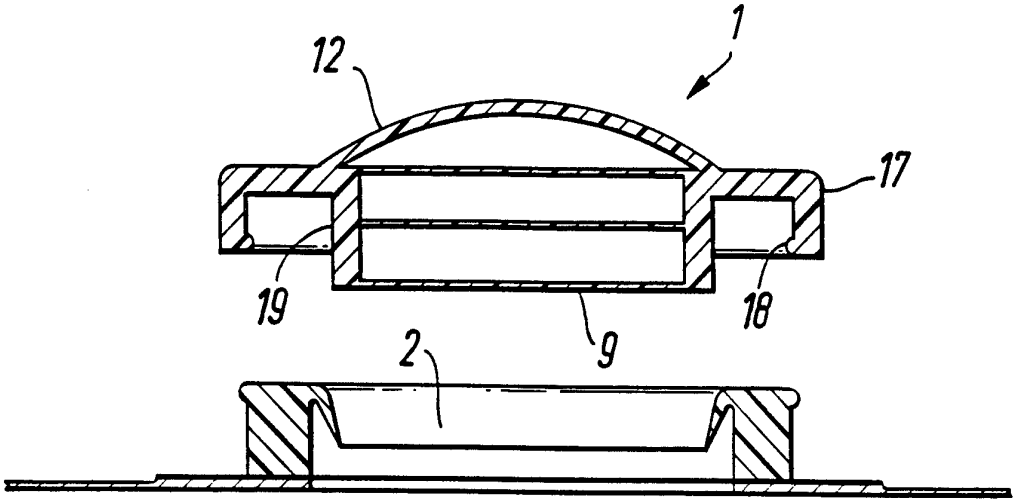

Fig. 2a

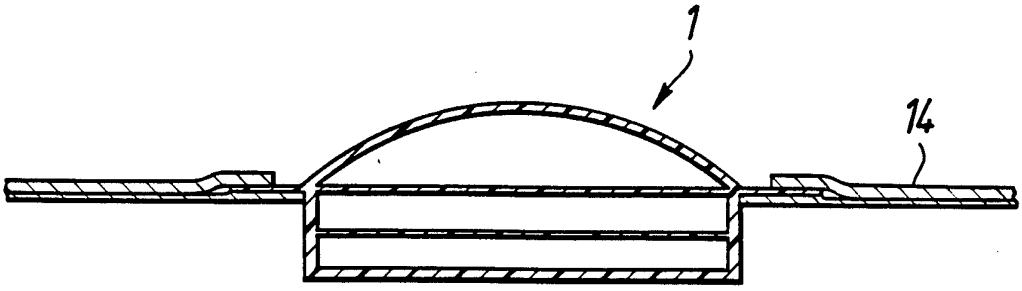

Fig. 2b

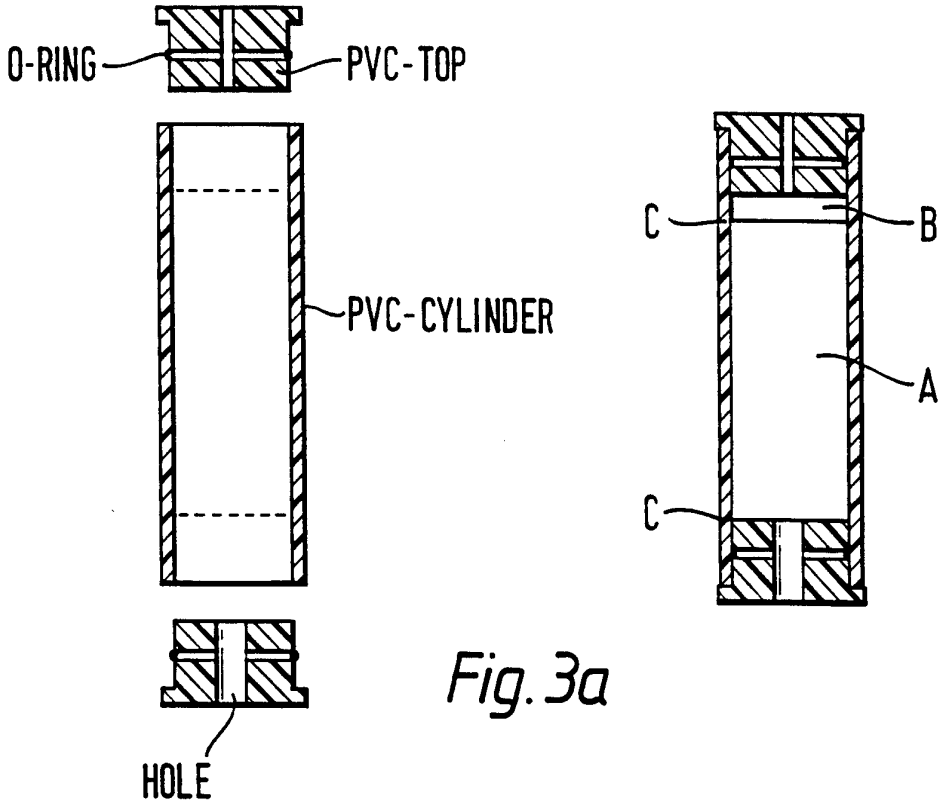

Fig. 3a

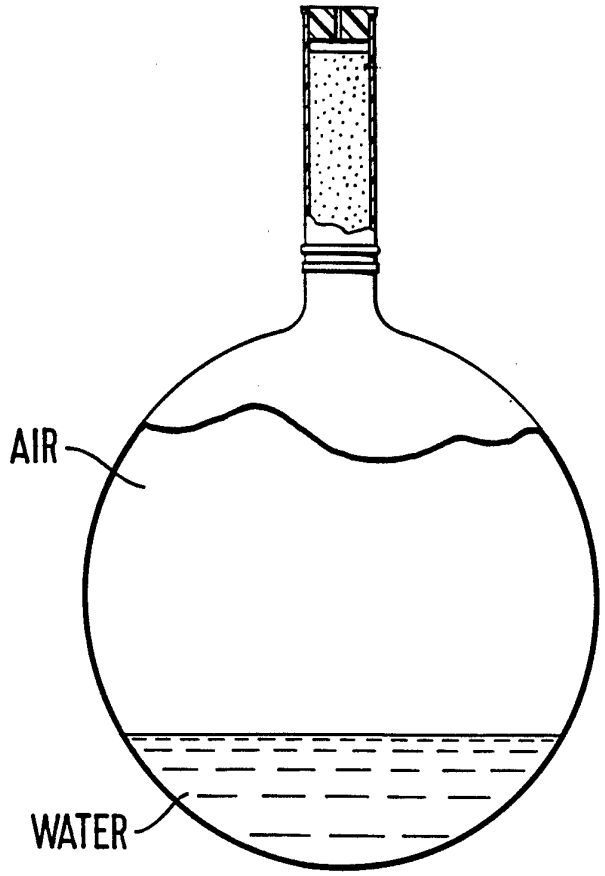

Fig. 3b

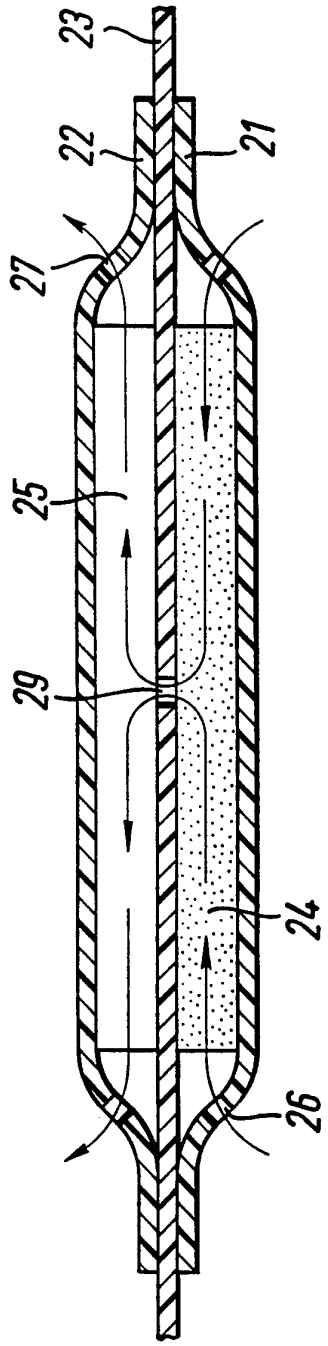

Fig. 4a

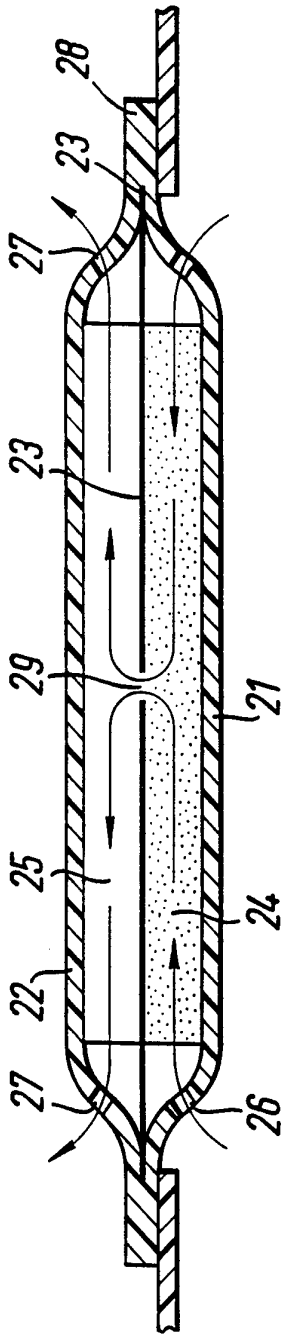

Fig. 4b

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO 94/00127

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A61F 5/441 // B 01 D 53/00
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)

IPC6: A61F, B01D

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

SE,DK,FI,NO classes as above

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

WPI, CLAIMS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP, A1, 0235928 (COLOPLAST A/S), 9 Sept 1987 (09.09.87), figures 2,4	1,3,7-12,14
A	DK, B, 147293 (DANSAC A/S), 16 July 1983 (16.07.83)	1,7-14
A	US, A, 4449970 (DAVID R. BEVAN ET AL.), 22 May 1984 (22.05.84), figures 6-8	1,7-8,12
A	US, A, 4938749 (OLE R. JENSEN), 3 July 1990 (03.07.90), figure 2	1

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" erlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
31 October 1994	02 -11- 1994
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Leif Brander Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO 94/00127

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Claims 1-8: Valve device and use thereof.

Claims 9-10 and 12: A pouch for the receipt of body waste products.

Claim 11: A panel

Claims 13-14: A multi-compartment device.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

01/10/94

International application No.
PCT/NO 94/00127

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A1- 0235928	09/09/87	NONE	
DK-B- 147293	16/07/83	NONE	
US-A- 4449970	22/05/84	GB-A,B- 2083760	31/03/82
US-A- 4938749	03/07/90	NONE	