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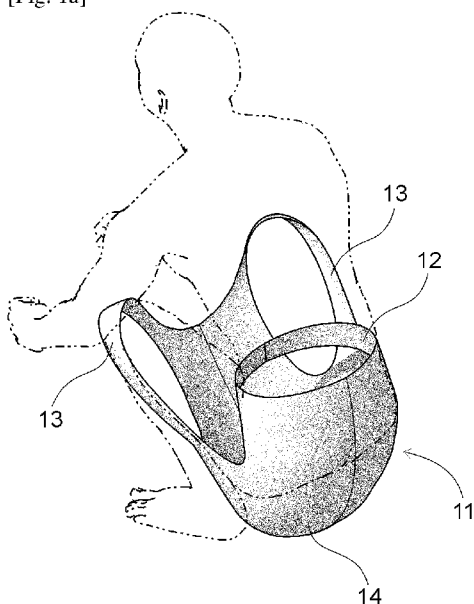
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(54) Title: PORTABLE, POCKETABLE AND DISPOSABLE TOILET USABLE IN SQUATTING POSITION

[Fig. 1a]



(57) Abstract: Toilet is one of the most used devices for human. Many times occur when an appropriate toilet is not available. The first mode of this device is a nylon waterproof container (11, 21), such as a plastic bag, that is made up of a sheet (15), having strips (12, 13) in its corners to tie around the waist and knees and when the user squatted, a suspended squat toilet bowl is formed beneath the user's body. The other mode of the device is a folded box (31) that, when unfold, forms a box with various slopes, with an insulation layer (33), inside of it, to be placed under the person for covering both urination and defecation parts of body. This device is designed as a portable, pocket and disposable toilet for both defecation and urination in the position of sitting on the knee or squatting, just like on the squat toilet.



PORTABLE, POCKETABLE AND DISPOSABLE TOILET USABLE IN SQUATTING POSITION

Technical Field

[0001] This invention is about designing a disposable, bag or box shaped squat toilet which could be folded and fitted in the pocket for easy transportation and could be used as toilet in squatting position.

Background Art

[0002] There are a few patents about disposable or portable toilets which could be used for urination and defecation in squatting position:

[0003] 1- Bags kept by hand or tied in place of urination or defecation of body:
(US6754914B2, US8663181, US3597770A)

[0004] - They are not suitable for both urinating and defecating at the same time, so they are usually designed for just defecation or just urination.

[0005] - It is very difficult to keep them beneath the hips by hands.

[0006] - If connected to anal by tie, it is not healthy and also is not acceptable by eastern cultures.

[0007] 2 - Sitting-position disposable toilets with seat: (US7996930B2, US6449782B1, US6116780)

[0008] - Which in fact are a simple and lightweight type of sitting toilets, are not usable instead of squatting toilet which should not have contact to hips in eastern cultures especially in Islam.

[0009] - Due to the need for strength to bear the weight of the user, they are bulky and expensive and not suitable for one-time use.

[0010] 3- Standing situation toilets:

[0011] - Include a bag or tank that comes in front of the anus and have a tube to guide the urine to the reservoir.

[0012] - standing position in toilet is not acceptable in eastern cultures and prohibited in Islam.

[0013] - Regardless of cultural and religious issues, the standing state is by no means a good condition for repelling, due to the problem of intestinal and anal movements and the possibility of contamination.

[0014] 4- Bottle or can shaped containers, which have different openings: (US3432866A)

[0015] - Only suitable for urination, due to the impossibility of fittings against the anus

[0016] - Are expensive for disposing.

[0017] - Due to bulkiness, carrying and keeping them is not easy.

[0018] According to the above, the disadvantages of previous solutions can be listed as

follows:

- [0019] - Generally not flexible and have low portability.
- [0020] - Generally not disposable. They are made of non-cheap materials and also are non-healthy for reuse, even if washed.
- [0021] - Often designed for one case, just for urination, or just for defecation.
- [0022] - They are not suitable for squatting position, it is hard to keep them beneath the hip.
- [0023] - Defecation used items often cause body contamination, because they are either designed for use in stand-up position or just like sitting toilets, have a seat that is may cause contamination and prohibited in some cultures.

Summary of Invention

- [0024] Toilet is one of the most used devices for human. Many times occur when an appropriate toilet is not available. Also many people especially in eastern countries only use squat type toilets which may be not in reach in many places or countries.
- [0025] The first embodiment of this device is a nylon waterproof container **11**, such as a plastic bag, that is made up of a nylon sheet **15**, having strips **12,13** in its corners to tie around the waist and knees and when the user squatted, a suspended squat toilet bowl is formed beneath the user's body.
- [0026] The second embodiment **21** is the same as the first embodiment **11** with some additional parts like a plastic water container **22** for washing the body after using the toilet with a lid **23** above it for pouring water into it and a pipe or hose **24** at the bottom with a perforation **25** at its bottom.
- [0027] It also has string **26**, around the sheet, placed into a groove **27** which is like a ribbon sewn on the sheet **28**, and a portion of the string is outside the groove to be pulled by the user to make the main bag **28** in the form of a packed garbage bag without the possibility of contamination of the hand and body.
- [0028] The third embodiment of this device is a folded box **31** that, when unfold, forms a box with various slopes, with an insulation layer **33**, inside of it, to be placed under the person for covering both urination and defecation parts of body.
- [0029] Forth embodiment **41** of this squat toilet is the same as previous embodiments by adding a special cover such as a nylon sheet or film **41**, which could be wrapped around the body or waist like a towel, to cover the body while using disposable squat toilets and preventing the naked parts of the body to be seen, while the hands can reach the body for washing through some gaps **42** on that sheet **41**.

Technical Problem

- [0030] Toilet is one of the most used facilities of human beings, and every healthy person needs to use it at least once a day. Many times occur when the toilet or public toilet is not in reach or for some reason they are not appropriate to be used. For example,

during a trip or absence of a healthy or appropriate toilet, also failure, time limitation or many other reasons. Also many people especially in eastern countries only use squat type toilets which may be not in reach in many places or countries.

Solution to Problem

[0031] **FIGS.1a-4d** First embodiment **11** of this squat toilet comprises of the following main parts:

[0032] - A nylon waterproof container **11**, such as a plastic bag, consisting of a formed sheet **15** and some strips on its corners **12, 13**.

[0033] This bag **15** is designed to form a suspended toilet bowl **11** when it hanged from strips **12, 13** away from each other in the air, so that the lowest or deepest part **14** set in the rear half of the bag and all other parts slope toward it.

[0034] - A few perforations **16** are embedded in strips **12, 13** out of the sheet **15**, so that they can be torn and cut off if necessary after use.

[0035] This sheet **15** can be folded and put in a small pack when produced so that it can easily be carried in a bag or pocket.

[0036] This bag can contain moisture absorbent content in the form of powder or sheets in the place of collecting wastes **14** to transform the urination liquids to jelly or semi solid, which makes it easier to carry and lowers the possibility of contamination.

[0037] **Figs. 4a-4d** Function steps of the squat toilet of first embodiment **11**:

[0038] - Remove the bag **15** from the package and unfold it.

[0039] - Place the top of the sheet behind the waist so that the two strips **12** come from the back to the front of the waist and connect to each other, with knotting, glue, clamp, button or etc.

[0040] - Tie the bottom strips of the sheet **13**, which are located behind the knees, around the knees.

[0041] - **Fig.4d** sit in squat position on the knees.

[0042] - After finishing use of toilet, open the bag strips **12, 13** or tear from the perforation lines **16** to carry the bag to the waste bin.

[0043] **FIGS.5a-6b** Second embodiment **21** of this squat toilet is the same as the first embodiment **11** having some additional parts:

[0044] - A plastic water container **22** with a lid **23** above it for pouring water into it and a pipe or hose **24** at the bottom with a perforation **25** at its bottom.

[0045] This water container **22** is placed in the upper middle of the main bag **28** on the back of the waist so that it is inside the main bag and its hose **24** is facing downwards.

[0046] - A string **26**, around the sheet, placed into a groove **27** which is like a ribbon sewn on the sheet **28**, and a portion of the string is outside the groove **27** to be pulled by the user to make the main bag **28** in the form of a packed garbage bag without the pos-

sibility of contamination of the hand and body.

- [0047] This embodiment **21** is an improvement to the first embodiment **11**, with the addition of washing and packaging possibility.
- [0048] Function steps of the squat toilet of second embodiment **21**:
- [0049] - Remove the bag **28** from the package and unfold it.
- [0050] - Fill the washing water container **22** with the water and close the lid **23**.
- [0051] - Place the top of the sheet behind the waist so that the two strips **12** come from the back to the front of the waist and connect to each other, with knotting, glue, clamp, button or etc.
- [0052] - Tie the bottom strips of the sheet **13**, which are located behind the knees, around the knees.
- [0053] - **Fig.4d** sit in squat position on the knees.
- [0054] - After using toilet, tear the perforation **25** of the container pipe **24** by pulling it, and wash the body with water by pulling the tube head towards the body. The wasted water from the washing pours into the main bag **21**, without causing the body to become contaminated.
- [0055] - After washing, remove the bag **26** on both sides to separate the container from the strips **12**, **13** and the body, and form a packed garbage bag to carry to the waste place.
- [0056] **FIGS.7a-9f** Third embodiment **31** of this squat toilet comprises of the following main parts:
- [0057] - A box-like container **32** made of paper or cardboard which, by means of cutting and folding get to the form of a two-part container, consisting of floorboards and wallboards so that its walls make the box stable and prevents contents dropout. The floor folded to form two slopes, one is lying on the floor below the hips and the other standing in front of the urine output part of the body, so the standing part slopes down to the lying part in about 45 degrees.
- [0058] This box has folding lines that can be folded so that it looks like a small business card.
- [0059] - A nylon waterproof container **33**, such as plastic bag, placed inside the cardboard container **32**, which has a string in grooves around its opening edges **26**.
- [0060] This bag **33** actually makes the cardboard box **32** waterproof, and also allows it to be packed into the form of a garbage bag by pulling the string **26** after finishing use of toilet.
- [0061] This device **31** is in fact a disposable squat toilet bowl and the main difference between this to the first embodiment **11** is its lack of connection to the user's body and its self-stability. So it's easier to use in some situations and for some people.
- [0062] This box **31** can contain moisture absorbent content in the form of powder or sheets in the place of collecting wastes **14** to transform the urination liquids to jelly or semi

solid, which makes it easier to carry and lowers the possibility of contamination.

[0063] Function steps of the squat toilet of third embodiment **31**:

[0064] - Remove the box **31, 32** from the package and unfold it **Figs.9a-9f**.

[0065] - Put one side of the box floor on the ground floor beneath the hips, while the sloped floor of the box faces the urination part of the body **Figs.7a-8b**.

[0066] - **Figs.7a-7b** sit in squat position on the knees over the box

[0067] - After finished using the toilet, pull the inner bag strings **26** to close and carry the bag to the waste bin.

[0068] **FIGS.10a-10e** Forth embodiment **41** of this squat toilet is the same as previous embodiments by adding a special cover:

[0069] - A flexible nylon film or sheet **41**, which could be wrapped around the body or waist like a towel, and fastened **43** in the back to cover the body while urinating on disposable toilets in squatting position **11,21,31** and preventing the naked parts of the body to be seen.

[0070] - There are some gaps **42** in its body to allow the hands to reach the user's body in the necessary parts for washing.

[0071] Many times it is hard to find a place to hide when using these squat toilet outdoor so this especially designed cover allows the user to use a disposable toilet in most places with more comfort, preventing the naked parts of the body to be seen.

Advantageous Effects of Invention

[0072] - It has the needed efficiency, that is, with a suitably sized enclosure and a convenient form, it can be easily and quickly prepared to act as a squat toilet.

[0073] - It is so compact and lightweight that is easily portable, even in the pocket.

[0074] - It is completely hygienic and anti-pollution and prevents fecal and urinary tract contact with the body.

[0075] - In practice, it is really disposable, which means it is so simple, compact and inexpensive that is quite cost effective to throw away after a single use.

[0076] - Useful for everyone: women, men, children, elderly and etc.

Brief Description of Drawings

[0077] Exemplary embodiments of the present invention are illustrated by way of example in the accompanying drawings in which like reference numbers indicate the same or similar elements:

Fig.1a

[0078] [Fig.1a] Rear isometric view of the bag type squat toilet in first embodiment when used by the user

Fig.1b

[0079] [Fig.1b] Frontal isometric view of the bag type squat toilet in first embodiment when

used by the user

Fig.1c

[0080] [Fig.1c] Side view of the bag type squat toilet in first embodiment when used by the user

Fig.2a

[0081] [Fig.2a] Rear isometric view of the bag type squat toilet in first embodiment in ready-to-use mode

Fig.2b

[0082] [Fig.2b] Frontal isometric view of the bag type squat toilet in first embodiment in ready-to-use mode

Fig.2c

[0083] [Fig.2c] Side view of the bag type squat toilet in first embodiment in ready-to-use mode

Fig.3a

[0084] [Fig.3a] Spread shape of the bag type squat toilet in first embodiment in the case of having separated sets of strips for each knee

Fig.3b

[0085] [Fig.3b] Spread shape of the bag type squat toilet in first embodiment in the case of having one set of strips for both knees

[0086] Views of how to use the bag type squat toilet in first embodiment:

Fig.4a

[0087] [Fig.4a] Frontal view of putting the bag in the right place, behind the back

Fig.4b

[0088] [Fig.4b] Frontal view of tying bag strips, around waist and knees

Fig.4c

[0089] [Fig.4c] Side view of tying bag strips, around waist and knees

Fig.4d

[0090] [Fig.4d] Sitting in squat position

Fig.5a

[0091] [Fig.5a] Frontal isometric view of the bag type squat toilet in second embodiment

Fig.5b

[0092] [Fig.5b] Side view of the bag type squat toilet in second embodiment

Fig.6a

[0093] [Fig.6a] Spread shape of the bag type squat toilet in second embodiment

Fig.6b

[0094] [Fig.6b] View of placement of washing water container in the bag type squat toilet

Fig.7a

[0095] [Fig.7a] Rear isometric view of the box type squat toilet in third embodiment when used by the user

Fig.7b

[0096] [Fig.7b] Side view of the box type squat toilet in third embodiment when used by the user

Fig.8a

[0097] [Fig.8a] Rear isometric view of the box type squat toilet in third embodiment in ready-to-use mode including hidden lines

Fig.8b

[0098] [Fig.8b] Rear isometric view of the box type squat toilet in third embodiment in ready-to-use mode not including hidden lines

[0099] Views of unfolding stages of the box type squat toilet in third embodiment, not showing the inner bag:

Fig.9a

[0100] [Fig.9a] View of taking the box toilet out of the pack

Fig.9b

[0101] [Fig.9b] View of unfolding the box from first folding line

Fig.9c

[0102] [Fig.9c] View of unfolding the box from second folding line

Fig.9d

[0103] [Fig.9d] View of first stage of unfolding the box from wall folding lines

Fig.9e

[0104] [Fig.9e] View of second stage of unfolding the box from wall folding lines

Fig.9f

[0105] [Fig.9f] View of final step and the box is ready

Fig.10a

[0106] [Fig.10a] Frontal view of the special cover for squat toilet when tied around the waist

Fig.10b

[0107] [Fig.10b] Side view of the special cover for squat toilet when tied around the waist

Fig.10c

[0108] [Fig.10c] Rear view of the special cover for squat toilet when tied around the waist

Fig.10d

[0109] [Fig.10d] Side view of the special cover tied around the waist when using bag type squat toilet

Fig.10e

[0110] [Fig.10e] Side view of the special cover tied around the waist when using box type squat toilet

Industrial Applicability

[0111] Disposable squat toilet is one of the most commonly used devices for all human groups, due to its high portability, health and cost-effectiveness, and so it would have a high commercial and industrial potential.

[0112] The simplicity of its structure and consequently, the simplicity of its production, indicates its high potential to be produced in various industries, such as medical or disposable supply industries.

[0113] Due to its special attention to the four principles of "practicality", "simplicity", "being healthy" and "easy portability", has a high competency to be manufactured in the related industries.

Reference Signs List

- [0114] 11- Bag type squat toilet of first embodiment in ready-to-use mode
- [0115] 12- Waist strips
- [0116] 13- Knee strips
- [0117] 14- Place of collection of waste during use
- [0118] 15- Spread shape of the bag type squat toilet of first embodiment
- [0119] 16- Perforation line - Cutting location
- [0120] 17- Sewing seams of the middle of bag type squat toilet
- [0121] 21- Bag type squat toilet of second embodiment in ready-to-use mode
- [0122] 22- Washing water container
- [0123] 23- Washing water container filling lid
- [0124] 24- Washing container pipe outlet
- [0125] 25- Perforation line at the end of washing container pipe outlet
- [0126] 26- Round string wrap around the bag
- [0127] 27- Grooves for covering string wrap around the bag
- [0128] 28- Spread shape of the bag type squat toilet of second embodiment
- [0129] 31. Box type squat toilet of third embodiment in ready-to-use mode
- [0130] 32- Box
- [0131] 33- The insulation bag, installed inside the box
- [0132] 41- Special cover for using disposable squat toilets
- [0133] 42- Gaps on special cover for hand access to the body
- [0134] 43- Fastener of the special cover

Claims

- [Claim 1] A portable device for defecating and urinating in squatting position, comprising:
- a flexible and folding container (11,21,31) in the form of a lightweight and portable bowl or bag, wherein, when said container (11,21,31) moved out of the folded state, it stays stationary on the floor under the body (31) or hangs to the body with suspenders (11,21) keeping distance from the body and in a way that it covers both the defecation and urination parts of the user's body.
- [Claim 2] The device of claim 1, wherein said container (11,21) is made of flexible materials such as plastics and there are strips (12,13) on its corners to tie around some parts of the user's body like waist and the knees, to form a suspended toilet bowl, hanging beneath the body (11,21).
- [Claim 3] The device of claim 2, further comprising:
- a flexible container such as a sealable plastic bag (22);
 - a flexible pipe outlet (24) with a perforation (25) at the end of it, wherein said bag (22) is located in the back of the user's waist and in the said main container (21) which can be filled (23) with water and when the defecating and urinating finished, the end of the said pipe (24) should be opened from the perforation line (25) and the water inside the container (22) will be routed to the body for washing with the help of the hands.
- [Claim 4] The device of claim 2, further comprising:
- at least one string (26) that is located inside one or more grooves (27), around the container (28), wherein parts of the string (26) are outside of the groove (27), so they can be pulled by hands to form a closed bag without contamination of the hand and body.
- [Claim 5] The device of claim 1, wherein said container is a box or folding envelope (31), made from sheet materials such as paper or cardboard, consisting of floorboards and wallboards so that its walls make the box stable and prevents contents dropout. The floor folded to form two slopes, one is lying on the floor below the hips and the other standing in front of the urine output part of the body, so the standing part slopes down to the lying part.

- [Claim 6] The device of claim 5, further comprising:
- a waterproof bag (33) such as nylon which is lying in the box (32), wherein said bag covers all inner surfaces and edges of the box (32), and there is a string (26) within the grooves (27) in the edge of the bag (33), makes the box (32) insulated, in addition to making it possible to carry the contents easily and safely after the urination finished in the form of a sealed bag.
- [Claim 7] The device of claim 1 or 2 or 5 or 6, further comprising:
- a flexible sheet such as a nylon bag or film (41), wherein said sheet (41) could be wrapped around the body or waist like a towel, to cover the body while urinating and preventing the naked parts of the body to be seen, while the hands can reach the body for washing through some gaps (42) on that sheet.
- [Claim 8] The device of claim 1 or 5, further comprising:
- a flexible container (22) such as a sealable plastic bag;
- a flexible pipe outlet (24) with a perforation (25) at the end of it, wherein said bag (22) is located in the back of the user's waist or other parts of body which can be filled with water (23) and when the defecating and urinating finished, the end of the said pipe (24) should be opened from the perforation line (25) and the water inside the container will be routed to the body for washing with the help of the hands.
- [Claim 9] The device of claim 1 or 2 or 5 or 6, further comprising:
- moisture absorbent content in the form of powder or sheets in the place of collecting wastes (14) in the said container (11,21,31) to transform the liquids to jelly or semi solid, which makes it more easy to carry and lowers the possibility of contamination.

AMENDED CLAIMS

received by the International Bureau on 25 September 2019

- [Claim 1] A portable device for defecating and urinating in squatting position without direct connection to the defecation and urination areas of the body, comprising:
- A flexible and foldable sheet (15,28) consisting of one or more sheets cut from a flat and flexible material such as plastics, having some strips (12,13) on its corners, wherein, when said sheet (15,28) moved out of the folded state and its strips (12,13) tied around some parts of the user's body which are away from contamination, like waist and the knees, and sitting in squatting position, forms a suspended toilet bowl (11,21) hanging to the body with suspenders (12,13) and keeping distance from it, in a way that it is beneath the both defecating and urinating parts of the user's body without directly connecting to that contamination parts.
- [Claim 2] The device of claim 1, further comprising:
- A flexible container such as a sealable plastic bag (22);
 - A flexible pipe outlet (24) with a perforation (25) at the end of it,
- Wherein said bag (22) is located in the back of the user's waist and in the said main container (21) which can be filled (23) with water and when the defecating and urinating finished, the end of the said pipe (24) should be opened from the perforation line (25) and the water inside the container (22) will be routed to the body for washing with the help of the hands.
- [Claim 3] A method to make a portable device for defecating and urinating in squatting position without direct connection to the defecation and urination areas of the body, comprising:
- Using a flexible and foldable sheet (15,28) consisting of one or more sheets cut from a flat and flexible material such as plastics, having some strips (12,13) on its corners,
- Wherein, when said sheet (15,28) moved out of the folded state and its strips (12,13) tied around some parts of the user's body which are away from

contamination, like waist and the knees, and sitting in squatting position, forms a suspended toilet bowl (11,21) hanging to the body with suspenders (12,13) and keeping distance from it, in a way that it is beneath the both defecating and urinating parts of the user's body without directly connecting to that contamination parts.

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Statement under Article 19(1)**International application No.:****PCT/IB2019/054041**

The claims 1, 4, 5, 6, 7, 8 and 9 cancelled because of the available prior arts which revealed in the "INTERNATIONAL SEARCH REPORT", so the drawings 7 to 10 and the third and fourth embodiments in the description can be deleted.

The claim 2 in first application was an incomplete explanation of the main embodiment of this invention, which may not show the distinctions of this invention to nearby inventions.

The existing patents (CN1803110A, US3405714A and US6754914B2) about portable toilets which are close to this invention, at first glance may look similar to this invention because of their waist strips and containers under the body, but in fact their main characteristic is that they have one or two containers like tanks which connect directly to the defecation and urination parts of body without distance by their openings, holes and pipes attached to the body tightly with ties, and they don't work properly if there is a gap. Actually, they are designed for patients who must use it in sleeping position or having problem of not controlling urine.

But the main characteristic of this invention is the suspension of its bowl-formed container in the air, away from defecation and urination areas of body, only by hanging it from clean parts of the body (waist and knees) away from those contamination body areas as in eastern squat toilets.

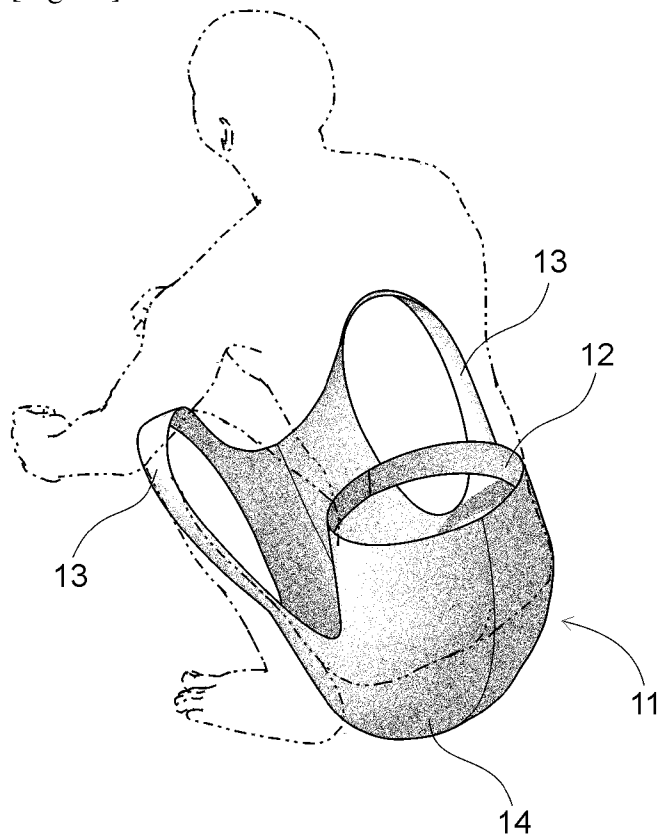
Another significant differences of them is in their structure and material types which in other inventions logically can't be disposable because of the variety of parts they have (like tanks with sealable openings, pipes and tight strips and belts) plus the strength needed in them, contrary to this invention which can be made from simple sheets of a flexible material like nylon.

So the claim 2 amended to show more clearly that fundamental differences of this device from the patent CN1803110A cited by ISA and the inventive steps over the patents which may be close to this invention.

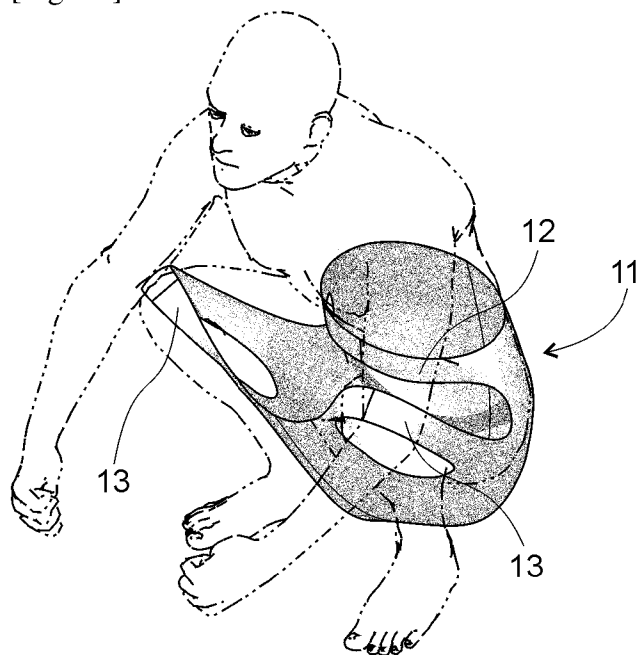
Claim 3 not changed.

Claim 10 added as the method form of the main claim.

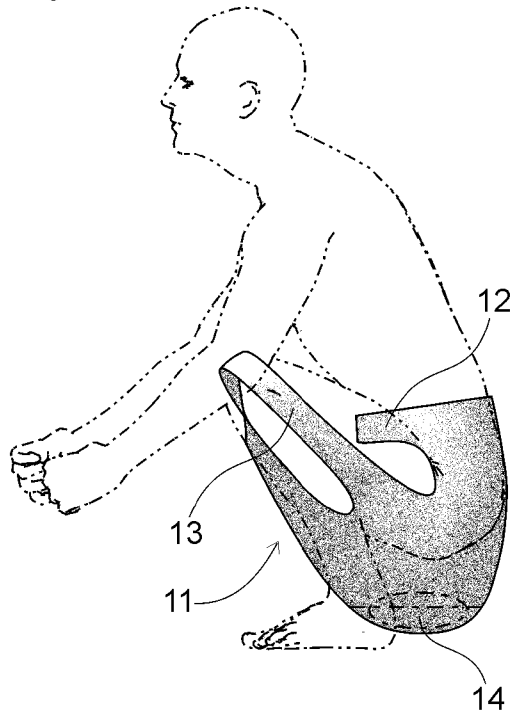
[Fig. 1a]



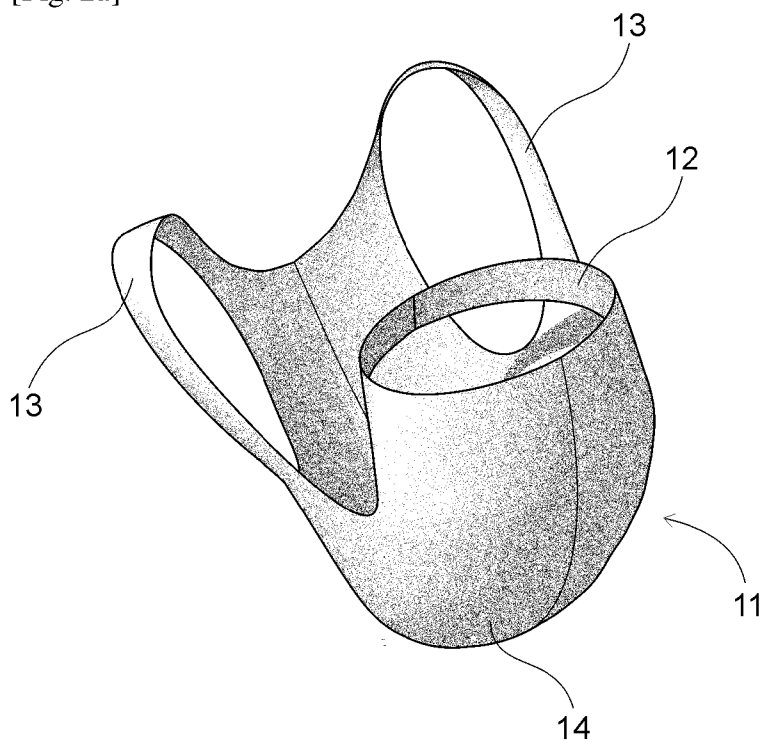
[Fig. 1b]



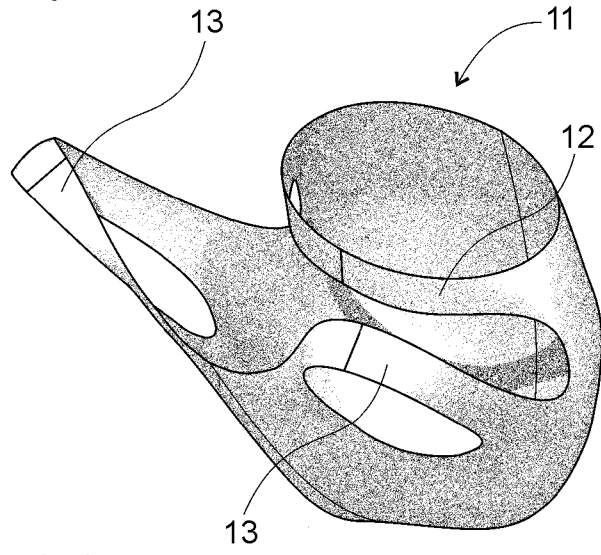
[Fig. 1c]



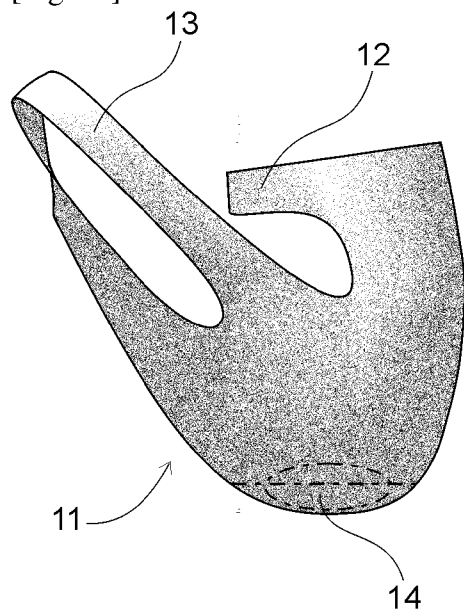
[Fig. 2a]



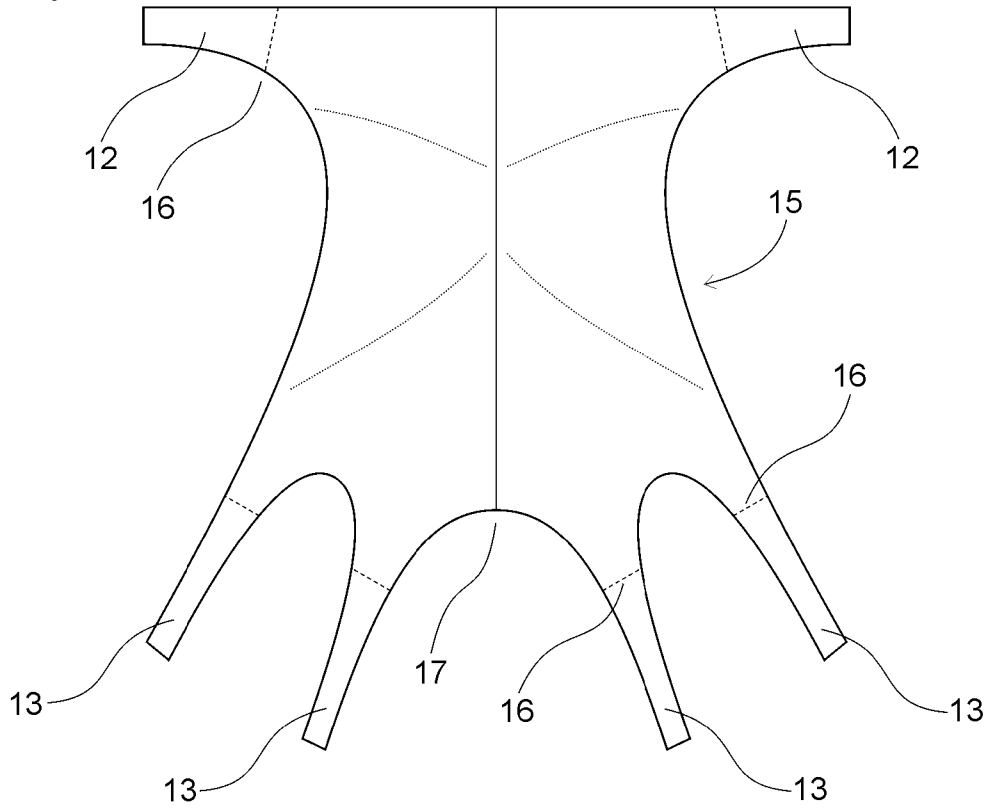
[Fig. 2b]



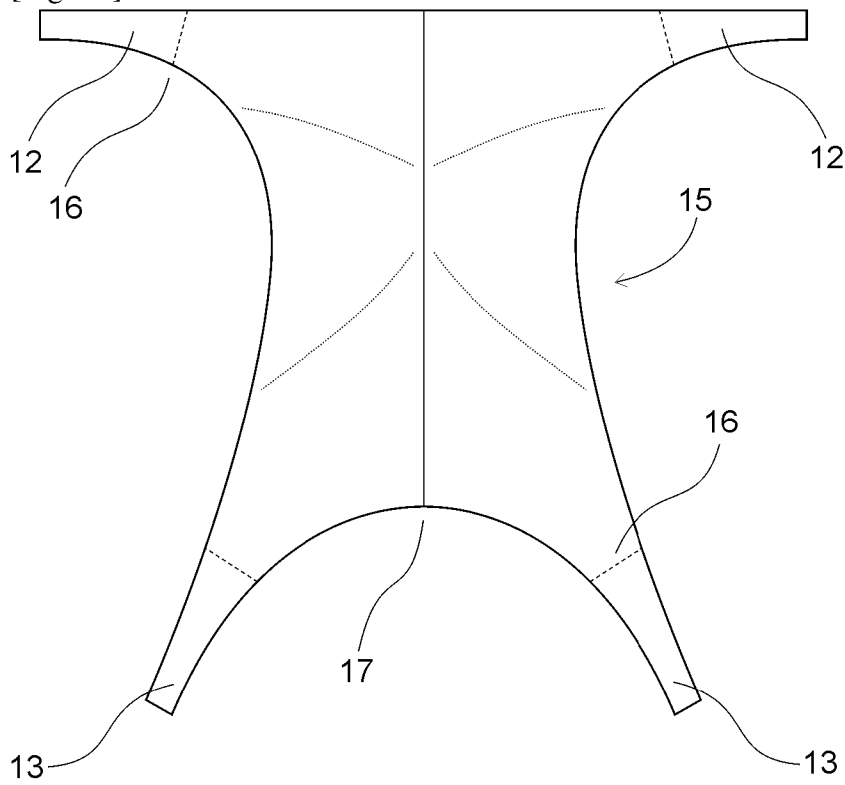
[Fig. 2c]



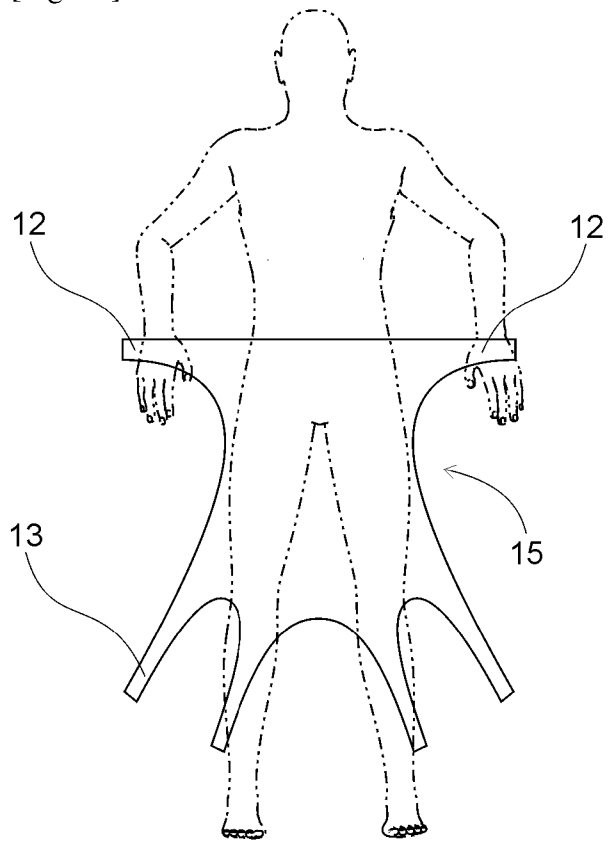
[Fig. 3a]



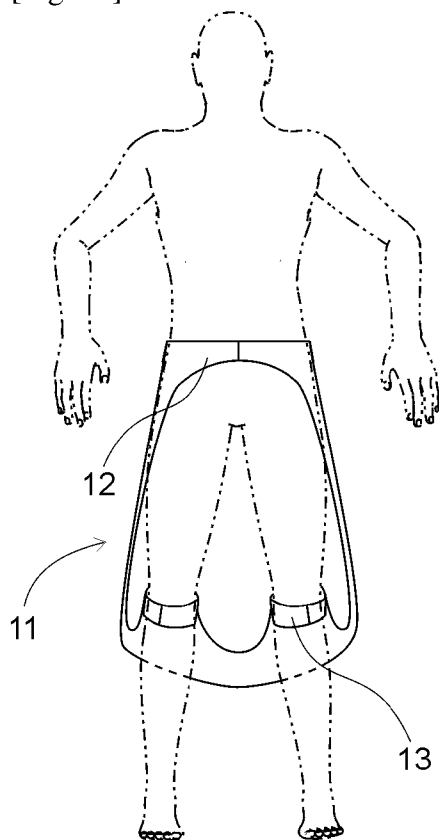
[Fig. 3b]



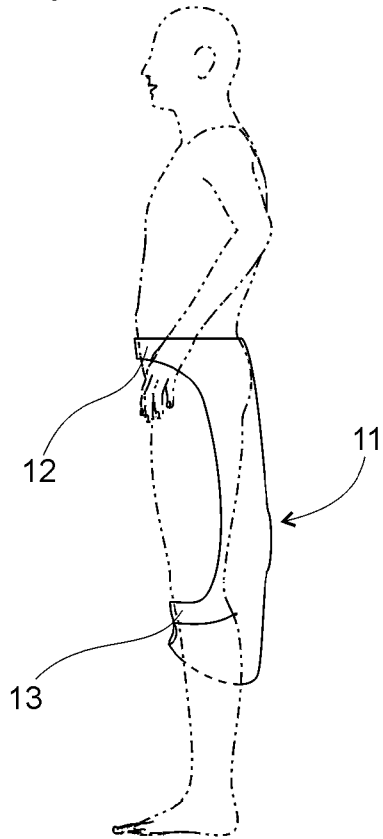
[Fig. 4a]



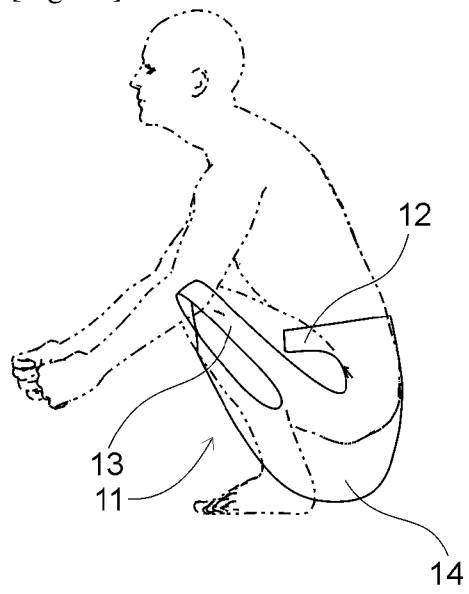
[Fig. 4b]



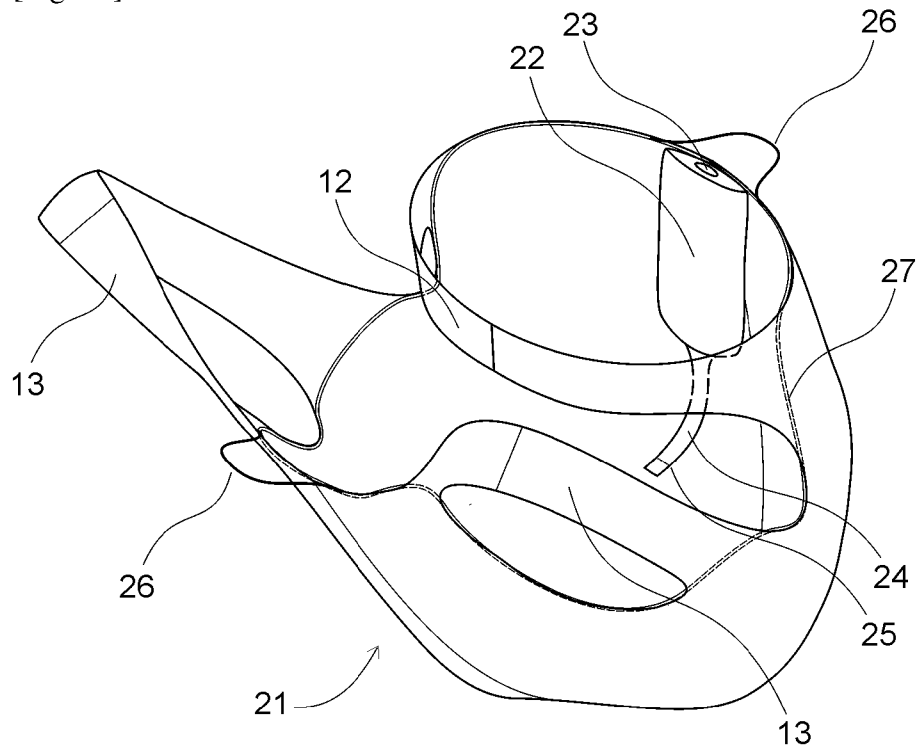
[Fig. 4c]



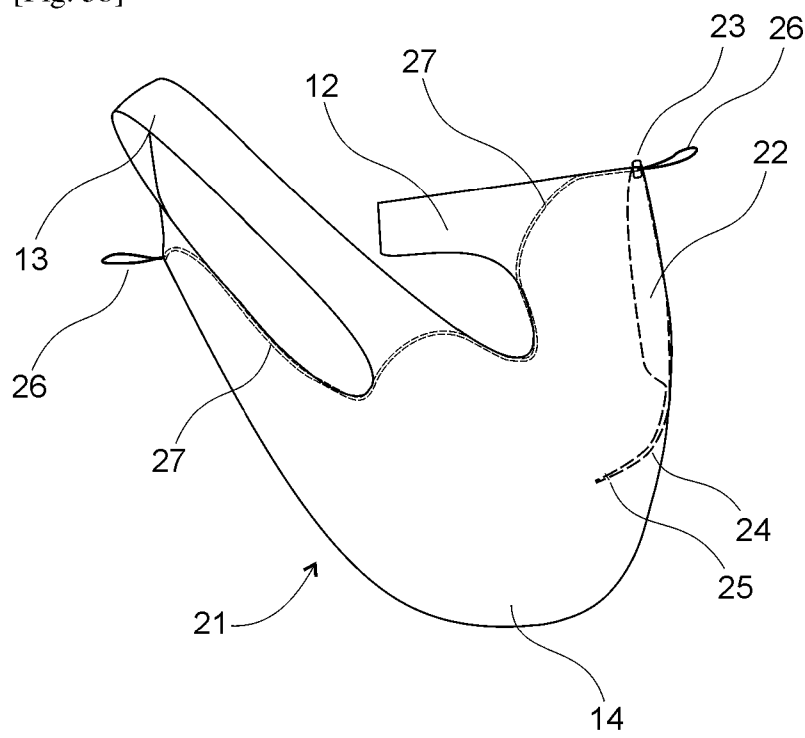
[Fig. 4d]



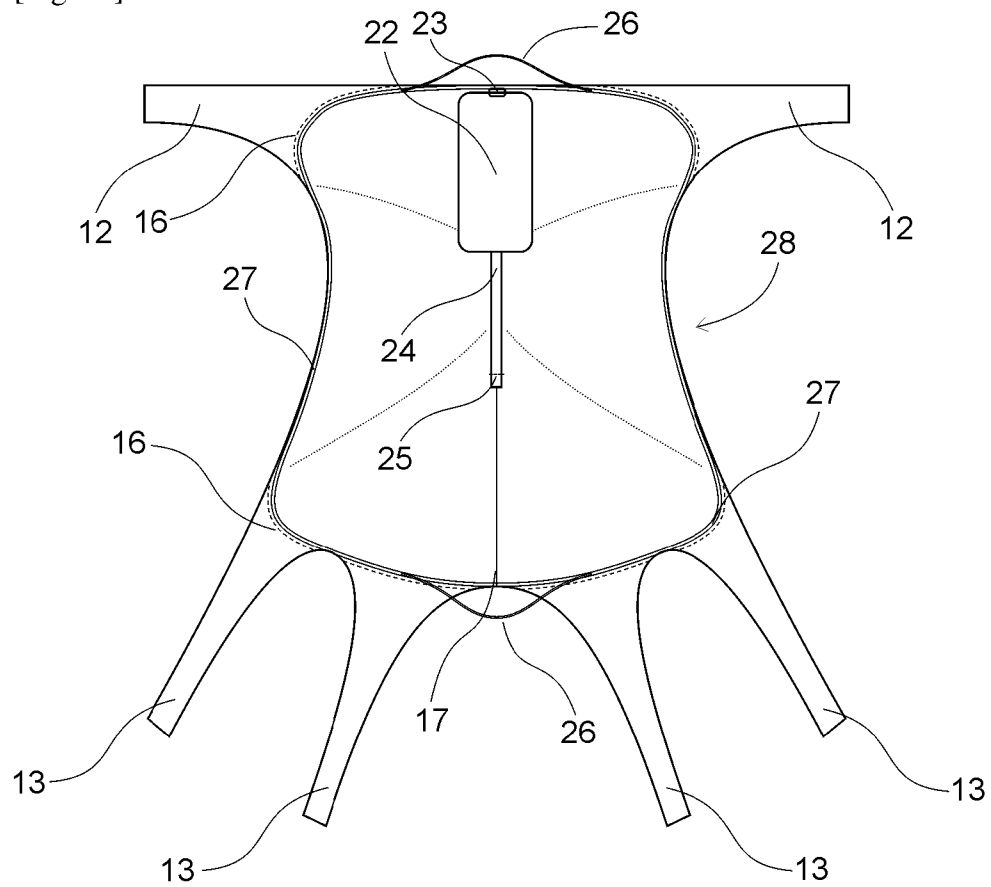
[Fig. 5a]



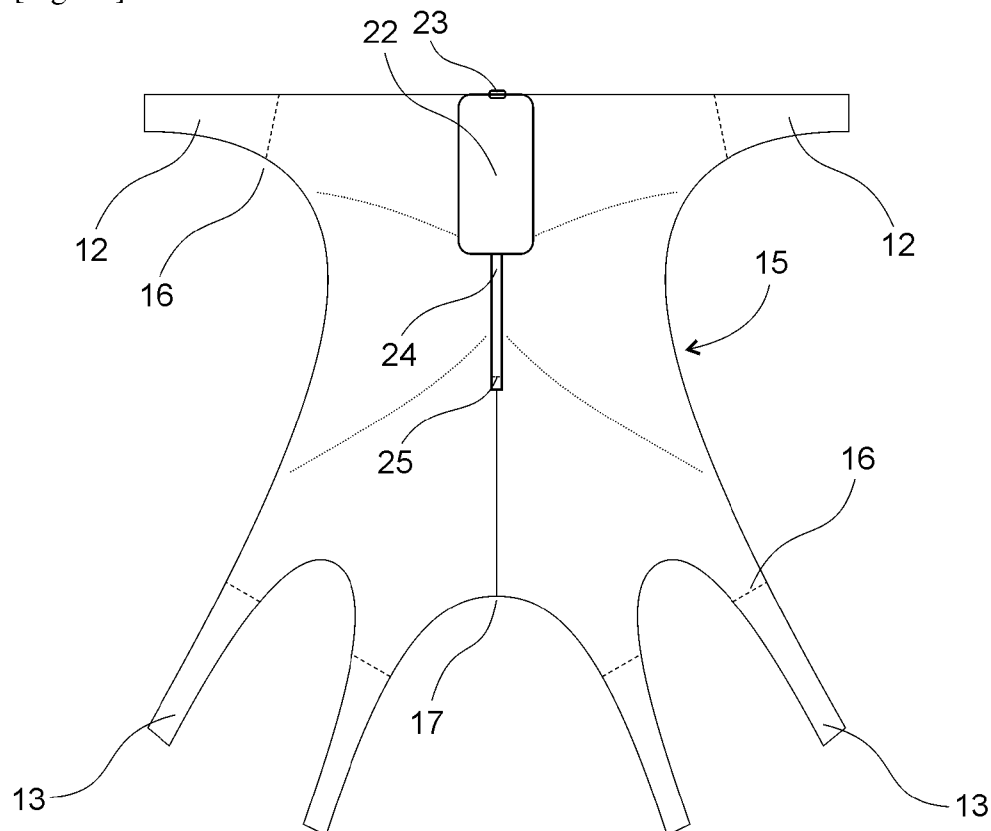
[Fig. 5b]



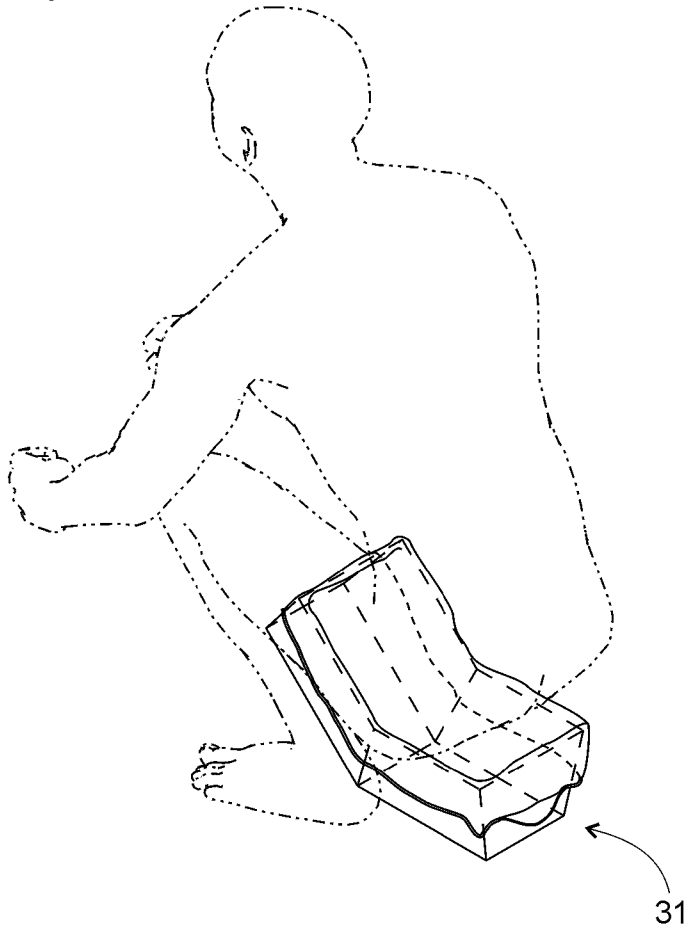
[Fig. 6a]



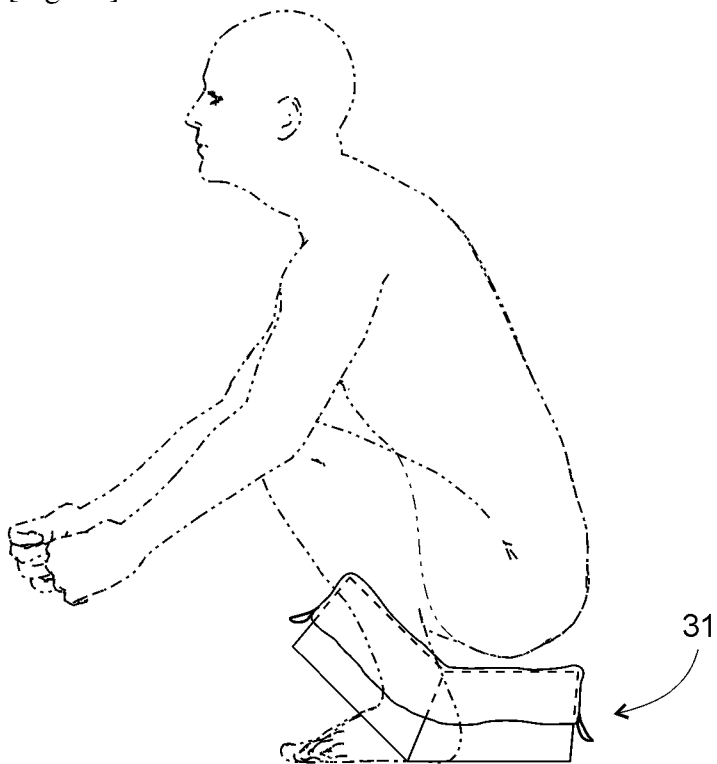
[Fig. 6b]



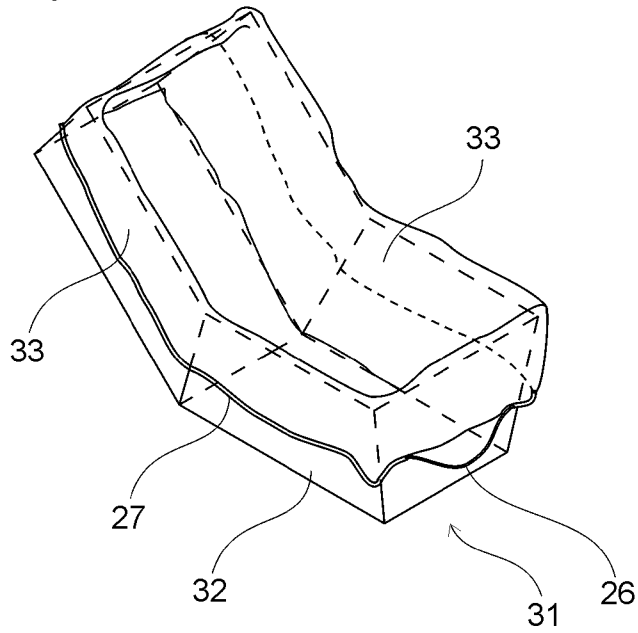
[Fig. 7a]



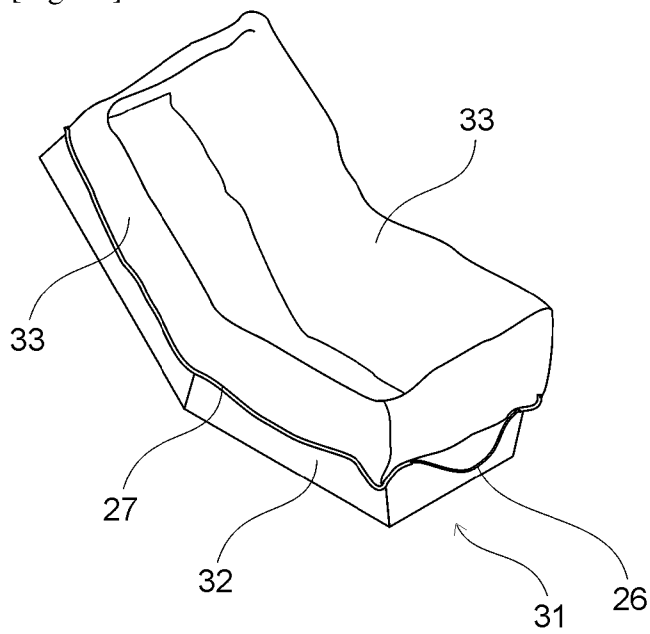
[Fig. 7b]



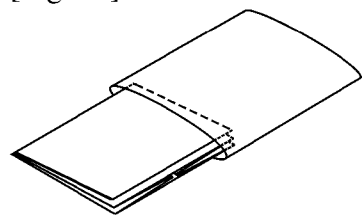
[Fig. 8a]



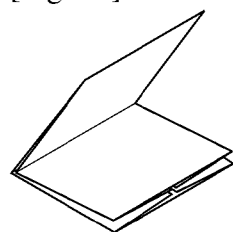
[Fig. 8b]



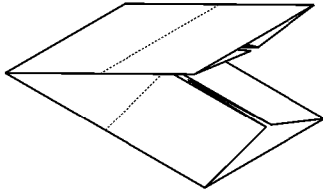
[Fig. 9a]



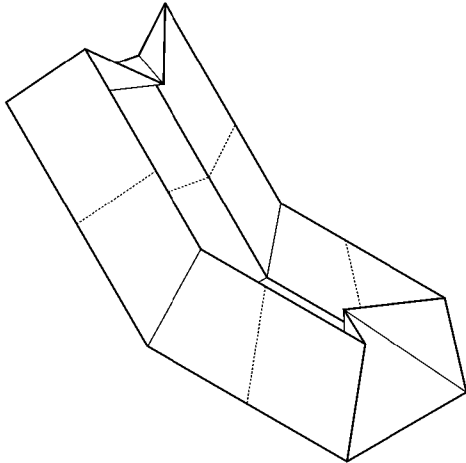
[Fig. 9b]



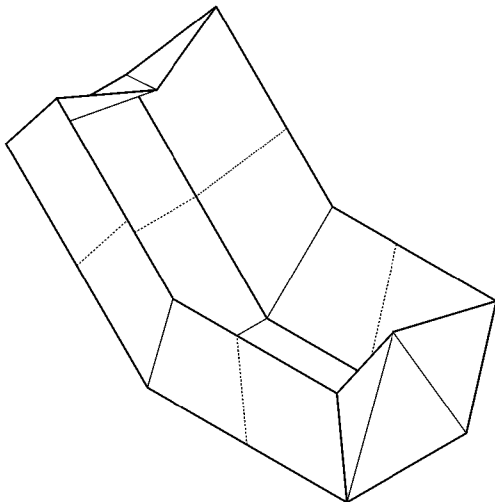
[Fig. 9c]



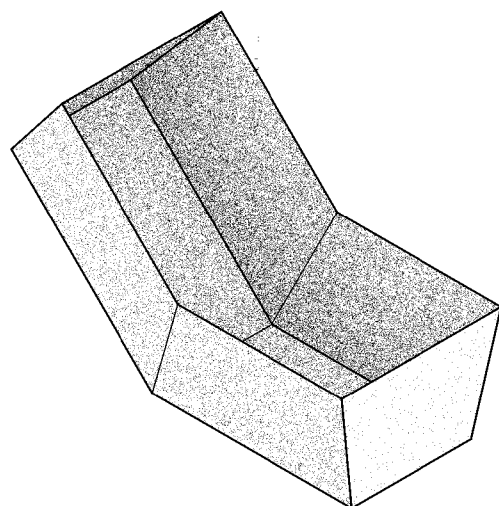
[Fig. 9d]



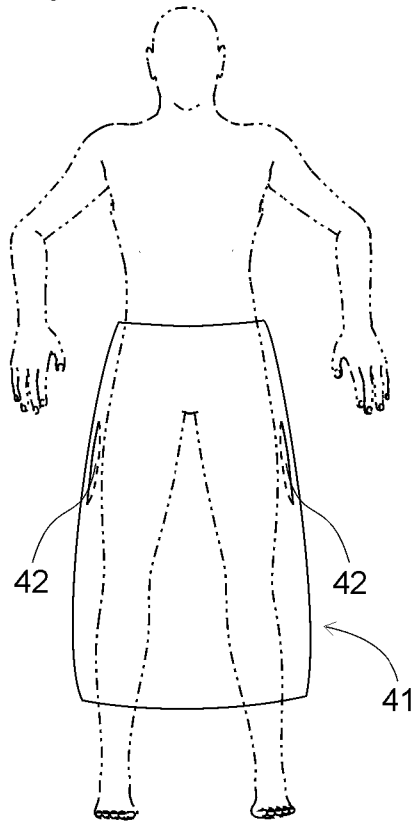
[Fig. 9e]



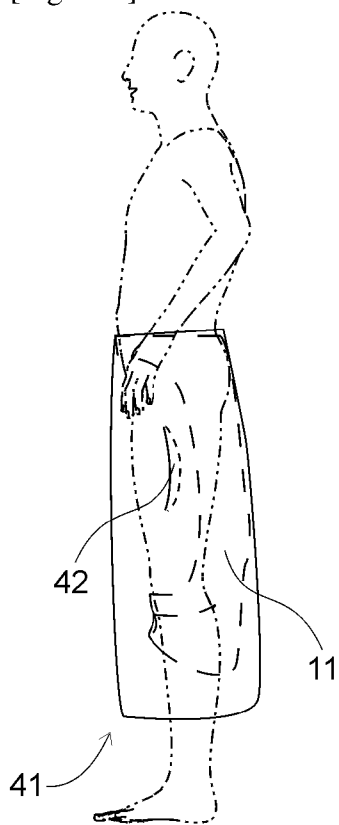
[Fig. 9f]



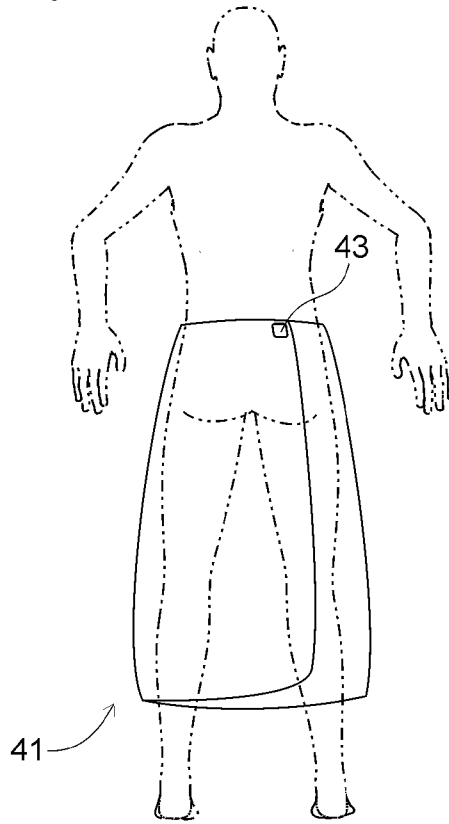
[Fig. 10a]



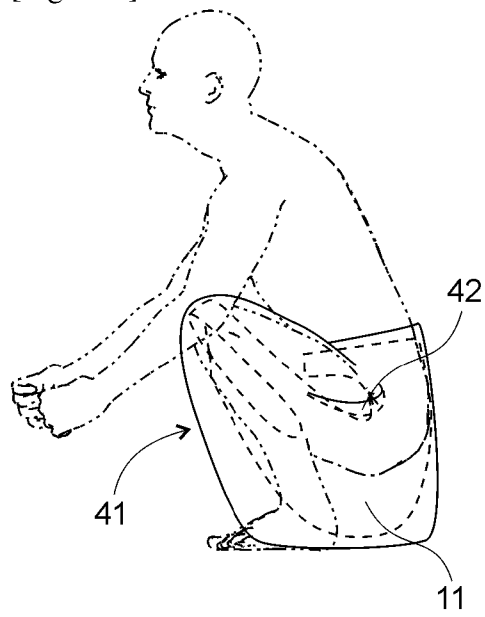
[Fig. 10b]



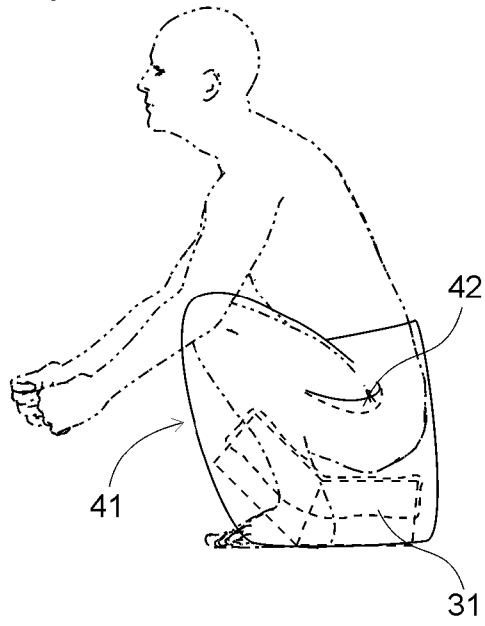
[Fig. 10c]



[Fig. 10d]



[Fig. 10e]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2019/054041

A. CLASSIFICATION OF SUBJECT MATTER

A61F5/44, A61F5/457, A47K11/00 Version=2019.01

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)

IPC: A61F, A47K ; CPC: Y02A 50/454

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)

TotalPatent One, IPO Internal Database

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN101474048 A (LI HONGMEI) 08 July 2009 (08.07.2009) Page 6-7, Figure 1-8	1, 5, 9
Y	Page 6-7, Figure 1-8	2, 4, 6, 7
A	Page 6-7, Figure 1-8	3, 8
Y	CN1803110 A (TANG YUQIANG et al.) 19 July 2006 (19.07.2006) Abstract, Figure 1	2
Y	US20020049416 A1 (SAVIO, Marcos Aparecido) 25 April 2002 (25.04.2002) Para [0031], Figure 4	4, 6
Y	WO2015105525 A1 (COLLINSWORTH, Allen) 16 July 2015 (16.07.2015) Para [0026], [0027], Figure 2, 5	7

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

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Date of the actual completion of the international search

09-08-2019

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/IB2019/054041

Citation	Pub.Date	Family	Pub.Date
US 2002049416 A1	25-04-2002	BR 0001235 A	20-03-2001
WO 2015105525 A1	16-07-2015	US 2016309970 A1	27-10-2016