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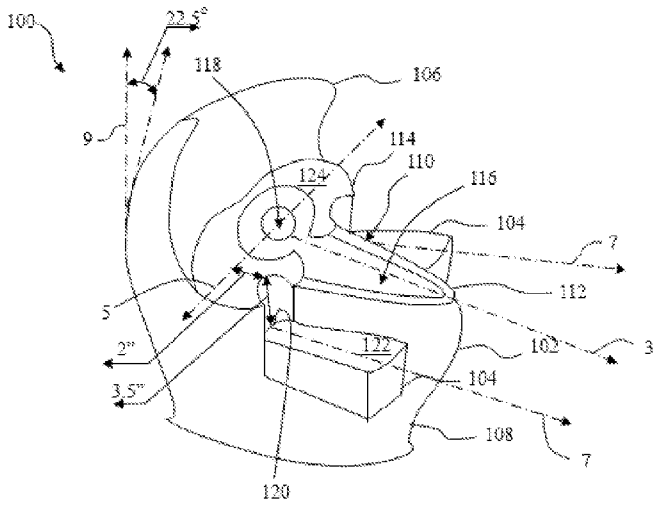

FIG. 2

(57) Abstract: Described herein is a toilet arrangement [100] for supporting a user in a squatting position. The 5 toilet arrangement [100] includes a toilet pot [102] with a rear seat portion [114], two footrests [104] on each side of the toilet pot [102], and a lumbar support [106], to support a user in natural squatting position. In the natural squatting position, the lumbar support [106] bends lumbar region at 22.5 degrees relative to the thighs of the user, the footrests [104] supports the foot to provide a hip-flex of 45 degrees, and the rear seat portion [114] supports the 0 buttock to provide push away force on the buttocks of the user. With such arrangement, anal canal [206] is completely vertically aligned with the rectum [204] of the user.

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TOILET ARRANGEMENT WITH SQUATTING FACILITY

TECHNICAL FIELD

The present subject matter relates to a toilet arrangement for supporting a user in a squatting position.

BACKGROUND

Various toilet arrangements, such as water closets, are known in sanitation industry, to enable persons to defecate in good sanitary conditions. A typical toilet arrangement includes a toilet bowl with an oval seat section. A user may be supported by placing buttocks on a periphery of the oval seat section and foots on ground, and thereby perform defecation. With such toilet arrangements, the user is supported in an upright sitting posture over the toilet arrangement. The upright sitting posture of the user is similar to a sitting posture, when the user sits on a chair. Though, such toilet arrangements promises good sanitary conditions, however, such toilet arrangements fail to facilitate easy and complete defecation. Particularly, as shown in FIG. 1, in a sitting position of the user when supported on such conventional toilet arrangement, the puborectalis muscle [202] of the user is not relaxed and creates a kink to a passage from the rectum [204] to the anal canal [206]. Thus, the anal canal [206] of a user is not vertically aligned with the rectum [204] of the user. This causes relatively less gravitational pull on the feces and thus incomplete defecation is experienced, which increases chances of fecal stagnation and may further lead to colon cancer. Accordingly, relatively greater strain is required to be applied frequently, to facilitate complete defecation. Chronic straining can however lead to various diseases, such as but not limited to, hernias, diverticulosis, and pelvic organ prolapse.

As an alternate to such toilet arrangement, an indigenous toilet arrangement may be used with a foot rest provided on top of the toilet arrangement. With indigenous toilet arrangement, the user is supported by placing the feet on the foot rests, to provide substantial natural squatting position for defecation. In such natural squatting position, the anal canal [206] of the user is vertically aligned with the rectum [204] of the user, due to relaxation of the puborectalis muscle [202]. Although, such position assists complete defecation, however, such indigenous toilet arrangements may fail to provide good sanitation conditions. Also, as in such indigenous

toilet arrangements, the feet of the user are only supported (which has to bear the total body weight), causing a discomfort to the user.

A number of solutions have been provided to address the aforementioned problems. For example, European patent EP0413063A1, discloses a toilet bowl with an upper rim and footrest means for supporting a user above ground level. The disclosed toilet bowl is structured, such that the upper rim and the foot rest means combine in use of the toilet bowl, to enable persons to sit on the toilet bowl and be supported in a natural squatting position. Although, this patent discloses support of the person in natural squatting position. However, the positon is still not completely full squat, as the appropriate angular inclination of the torso of the person relative to thighs is not focused in this article. Also, appropriate hip-flexing is also not achieved in this disclosure.

Another solution, as disclosed in United States Patent US5809583A, a toilet arrangement including a toilet bowl, a seat means, and two elongate footrest areas. The footrest areas are positioned not more than 20 cm below a front edge of the seat means. The footrest areas are inclined enclosing an angle of 10 degree to 35 degree therein. The seat means is continually inclined from said rear end portion to said front end portion, such that the toilet arrangement enable a user to take a natural, squatting sitting posture in which the angle between the thighs and the torso is between 20 DEG and 50 DEG during defecation. Although, this document discloses the appropriate angular positioning of the footrest areas, and the bend of torso relative to the thighs of the user, however, the user is supported on a flat seat means causing a pointed normal force on one portion of the buttocks of the user. This causes a relatively larger pointed normal pressure on certain muscles (particularly muscles surrounding the anal canal [206]), thereby constricting the anal canal [206] and resulting in difficulty in defecation. Therefore, the whole purpose of the defecation is lost, due to constriction of the anal canal [206] of the user.

Therefore, there is a well felt need for a toilet arrangement that enables a user to take a natural squatting position with minimal anal canal [206] constriction, for facilitating complete defecation.

SUMMARY

An object of the present subject matter is to provide a toilet arrangement that supports a user in a natural squatting position for enabling complete defecation.

Another object of the present subject matter is to support the user with torso bent at 22.5 degrees relative to the thighs, feet inclined at an angle of 30 degrees and positioned 3.5 inches below the buttocks, and the buttocks being supported to experience push away force (angled force causing expansion of the buttocks). With such arrangement, the user is supported in the natural squatting position. Particularly, in the natural squatting position, the anal canal [206] is vertically aligned to the rectum [204] of the user. Also, as the feet are the inclined at an angle of 30 degrees relative to each other, the anal canal [206] is relatively more expanded in a lateral direction. Furthermore, as the buttocks experience the push away force at an angle (the push away force at an angle diverts away the buttocks), and the anal canal [206] is relatively more expanded in the lateral direction.

Yet another object of the present subject matter is to support the user with torso bent at 22.5 degrees relative to the thighs, hip-flex angle of 45 degrees, and the buttocks experiencing the push away force. With such arrangement, the anal canal [206] is vertically aligned to the rectum [204] of the user, and opens the anal canal [206] relatively wider in anterior and posterior direction. Moreover, as the buttocks experience the push away force (force inclined at an angle from a normal axis diverts away the buttocks), the anal canal [206] is relatively more expanded.

The subject matter described herein relates to the toilet arrangement including a toilet pot, at least two elongate footrests, and a lumbar support. The toilet pot includes an oval seat section with a front extended portion and a rear seat portion. The front extended portion defines a first opening and a longitudinal axis. The rear seat portion includes a spherically convex support surface with a second opening and a lateral axis passing through the second opening. Each of the at least two footrests is defined on each side of the toilet pot. Each footrest includes a rear end and a top surface. The rear end of each footrest is provided at a perpendicular distance of 2 inches from the lateral axis passing through the second opening. The top surface is provided at a vertical distance of 3.5 inches from a top of the front extended portion). Further, a longitudinal axis of each of the at least two elongated footrests are inclined relative to the

longitudinal axis of the front extended region at an angle of 30 degrees. The lumbar support is provided rearward to the toilet pot and is inclined at an angle of 22.5 degrees relative to a vertical axis. Thus, the toilet arrangement facilitates a user to take a natural squatting position while supported on the toilet arrangement.

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BRIEF DESCRIPTION OF DRAWINGS

The present invention, both as to its organization and manner of operation, together with further objects and advantages, may best be understood by reference to the following description, taken in connection with the accompanying drawings. These and other details of

10 the present invention will be described in connection with the accompanying drawings, which are furnished only by way of illustration and not in limitation of the invention, and in which drawings:

Figure 1 illustrates a schematic view of an anus region of a user, when supported on a toilet facility of PRIOR ART in a sitting position.

15 Figure 2 illustrates a schematic view of a toilet arrangement, in accordance with the concepts of the present disclosure.

Figure 3 shows a top view of a rear seat portion of an oval seat section of the toilet arrangement.

Figure. 4 illustrates a schematic of the toilet arrangement, while the user is supported on the

20 toilet arrangement, when viewed from a side of the toilet arrangement.

Figure 5 shows a bottom view of the toilet arrangement while the user is supported on the toilet arrangement, when viewed from a plane below the feet of the user.

Figure 6 illustrates a schematic view of the anus region of the user, when supported on the toilet arrangement in accordance with the concepts of the present disclosure.

25 Figure 7 shows an alternate embodiment of the toilet arrangement, including a plurality of footrests on each side of the toilet pot, along with the toilet pot and the lumbar support.

DETAILED DESCRIPTION

The present subject matter provides a toilet arrangement [100] to support a user in a natural

30 squatting position. Particularly, the toilet arrangement [100] as disclosed herein supports the

user such that a torso is inclined at an angle of 22.5 degrees relative to the thighs of the user, buttocks (hips) are flexed at 45 degrees, and the buttocks of the user are supported to receive a push away force (force inclined at an angle to a normal axis to divert away the buttocks), when the user is supported on the toilet arrangement [100]. Such positioning of the user relaxes the puborectalis muscle [202] of the user, and an anal canal [206] of the user is vertically aligned with the rectum [204] of the user, thereby allowing complete defecation.

Figure 1 shows a schematic view of an anus region [200] of a user, when supported on a toilet facility of PRIOR ART in a sitting position. As is shown, while the user is supported on such toilet facility in sitting position, a puborectalis muscle [202] of the user is not relaxed and the anal canal [206] of the user is not vertically aligned with the rectum [204] of the user. Therefore, incomplete defecation is experienced, while the user is supported on such toilet facility.

Figure 2 shows a schematic of the toilet arrangement [100], in accordance with the concepts of the present disclosure. Figure 3 shows a top view of a rear seat portion [114] of an oval seat section [110] of the toilet arrangement [100]. Figure 2 and Figure 3 should be referred in conjunction, to understand a structure and arrangement of various components of the toilet arrangement [100]. The toilet arrangement [100] includes a toilet pot [102], at least two elongated footrests [104], and a lumbar support [106]. Although, the toilet pot [102], the elongated footrests [104], and the lumbar support [106] are disclosed and described to be integrally formed on the toilet arrangement [100], it is obvious to a person skilled in the art that the toilet pot [102], the elongated footrests [104], and the lumbar support [106] may be provided as separate components suitably connected with each other to form the toilet arrangement [100].

The toilet pot [102] of the toilet arrangement [100] is similar to conventional collection bowl that receives the feces, as the person performs defecation while supported on the toilet arrangement [100]. Further, the toilet pot [102] supports the user along the buttocks of the user, while the user is supported on the toilet arrangement [100] for performing defecation. The toilet pot [102] includes a base [108], and the oval seat section [110] provided on top of the base [108]. The base [108] is supported on ground, to support the toilet arrangement [100] over the ground. The oval seat section [110] is a combination of a front extended portion [112] and the rear seat portion [114]. The front extended portion [112] forms a substantially oval

structure. The front extended portion [112] defines a first opening [116] therein, and a longitudinal axis, [3] is defined along a length of the front extended portion [112]. Furthermore, the rear seat portion [114] defines a second opening [118] and a lateral axis passing [5] through the second opening [118]. As is shown in Fig. 3, the rear seat portion [114] has a spherically convex surface [124]. Particularly, the spherically convex surface [124] of the rear seat portion [114] has a continuous contour of spherically convex shape, such that the rear seat portion [114] compliments and supports the buttocks of the user, when the user is supported on the rear seat portion [114] of the toilet arrangement [100]. Moreover, the spherically convex surface [124] of the rear seat portion [114] is structured such that a push away force (force inclined at an angle from a normal axis for diverting away the buttocks) is experienced by the buttocks of the user, when the user is supported on rear seat portion [114] of the toilet arrangement [100]. Particularly, as the push away force is applied at an angled on the buttocks applies, the push away force is applied at an angle on the muscles surrounding the anal canal [206]. This causes relatively more diversion of the buttocks, and thus expands the buttocks relatively more. Thereby avoiding constriction of the anal canal [206] in relatively a better manner, and causing better expansion of the anal canal [206].

The elongated footrests [104] are defined on the toilet pot [102], to support the feet of the user when the user is supported on the toilet arrangement [100]. In one embodiment, one footrest [104] is provided on each side of the toilet pot [102]. In an alternate embodiment, multiple footrests [104] stacked over each other are provided on each side of the toilet pot [102]. Although, the footrests [104] are described and disclosed to be defined as integral component of the toilet pot [102], it may be obvious to a person skilled in the art that the footrests may be provided to support as separate components relative to the toilet pot [102]. Figure 2 shows the embodiment of the toilet arrangement [100] with the single elongated footrest [104] on each side of the toilet pot [102]. In such embodiments, one elongated footrest [104] is positioned on left side of the toilet pot [102] and another elongated footrest [104] is positioned on right side of the toilet pot [102]. For ease in reference and understanding, structure and arrangement of one footrest [104] relative to the toilet pot [102] will be explained hereinafter, however, similar structure and arrangement of the other footrest [104] may be contemplated. The footrest [104] includes a rear end [120] positioned proximal to

the rear seat portion [114] of the toilet pot [102]. The footrest [104] is so structured and positioned, such that the rear end [120] is provided at a perpendicular longitudinal distance of 2 inches from the lateral axis [5] passing through the second opening [118]. Particularly, the perpendicular distance of 2 inches between the rear end [120] and the lateral axis [5], is measured along the longitudinal axis [3] of the front extended region [112]. Further, the footrest includes a top surface [122] provided at a vertical distance of 3.5 inches from a top of the front extended region [112] of the toilet pot [102]. Moreover, the footrest [104] are so structured and arrangement, such that a longitudinal axis [7] of the footrest [104] is inclined at an angle of 30 degrees relative to the longitudinal axis [3] of the front extended region [112]. Thereby, the footrest [104] supports the feet of the user, at a vertical downward distance of 3.5 inches below the second opening [118] of the rear seat portion [114], with ankle positioned at a perpendicular distance of 2 inches from the lateral axis [3] passing through the second opening [118], and feet inclined at 30 degrees relative to the longitudinal axis [3]. With such support of the feet of the user, a hip-flex angle of 45 degrees is achieved.

The lumbar support [106] is a back support provided integral to the toilet pot [102]. Although, the lumbar support [106] is described integral to the toilet pot [102], it may be obvious to a person skilled in the art that the lumbar support [106] may be provided as a separate component suitably attached to the toilet pot [102]. The lumbar support [106] is a curved section extending vertically from the rear seat portion [114] and suitably curving towards the front of the toilet arrangement [100]. Furthermore, the curved section of the lumbar support [106] is suitably curved, such that a tangent to the curved section of the lumbar support [106] is inclined at an angle of 22.5 degrees relative to a vertical axis [9]. With such arrangement, a lumbar region of the user is bent at an angle of 22.5 degrees relative to the thighs of the user, when the user is supported on the toilet arrangement [100].

Figure. 4 shows a perspective view of the toilet arrangement [100], while the user is supported on the toilet arrangement [100]. Figure 5 shows a bottom view of the toilet arrangement [100] while the user is supported on the toilet arrangement [100], when viewed from a plane below the feet of the user. Figure 4 and Figure 5 should be referred to in conjunction, to understand positioning of the user on the toilet arrangement [100]. In use of such toilet arrangements [100], a user sits on the toilet arrangement in a natural squatting position. In the natural

squatting position, the elongated footrests [104] support foots of the user, the rear seat portion [114] of the oval section [110] of the toilet pot [102] supports buttocks of the user, and the lumbar support [106] bends a torso of the user at an angle of 22.5 degrees relative to the thighs of the user. Particularly, in the natural squatting position, the elongated footrests [104] support foots of the user inclined at an angle of 60 degrees from each other, positioned at a vertical distance of 3.5 inches from a top of the front extended portion [114], and an ankle region of the foots of the user positioned at a perpendicular distance of 2 inches from the lateral axis [5] passing through the second opening [118]. This provides a hip-flex of 45 degrees to the user. Further, in the natural squatting position, the lumbar support [106] bends the lumbar region of the user at an angle of 22.5 degrees relative to the thighs of the user. Moreover, in the natural squatting position, the buttocks of the user is supported on the rear seat portion [114] of the oval section [110] of the toilet pot [102], such that the curved profile of the rear seat portion [114] compliments the buttocks of the user. This provides a push away force (force inclined at an angle from a normal axis for diverting away the buttocks) on the buttocks of the user, when the user is supported on rear seat portion [114] of the toilet arrangement [100]. Such push away force on the buttocks expands the buttocks relatively more, thereby avoiding constriction of the anal canal [206] in a relatively better manner. Also, due to the curved profile of the rear seat portion [114], the push away force is applied in a distributed manner to the buttocks of the user, which provides relatively more comfort to the user.

Figure 6 shows the schematic of the anus region [200] of the user, when supported on the toilet arrangement [100] in the natural squatting position as described in the aforementioned disclosure (torso bend of 22. 5 degrees, hip-flex of 45 degrees, and push away force on buttocks of the user). As is shown in figure 6, in the natural squatting position, as the user is supported by the toilet arrangement [100] as disclosed in the present disclosure, the puborectalis muscle [202] of the user is relaxed and the anal canal [206] of the user is completely vertically aligned with the rectum [204] of the user. Therefore, the gravitational pull is maximum on the feces, causing relatively lesser strain, for complete defecation and thus chances of such disease is eliminated. Also, as the buttocks of the user experience a push away force, constriction of the anal canal [206] is relatively highly reduced, assisting in complete defecation.

Figure 7 shows an alternate embodiment of the toilet arrangement [100], including a plurality of footrests [104] on each side of the toilet pot [102], along with the toilet pot [102] and the lumbar support [106]. It may be noted that the structure and arrangement of the toilet pot [102] and the lumbar support [106] is similar to previously defined embodiment. Further, structure and arrangement of footrests [104] arranged on one side of the toilet pot [102] will be described hereinafter, however, similar structure and arrangement of the footrests [104] on the other side of the toilet pot [102] may be envisioned. On each side of the toilet pot [102], the footrests [104] includes three footrests [104a], [104b], and [104c]. The three footrests are stacked above each other [104a], [104b], and [104c]. Each of the three footrests [104a], [104b], and [104c] is similar in shape and construction as the footrests [104] defined in the previous embodiment. Particularly, each of the three footrests [104a], [104b], and [104c] includes a rear end [120] positioned provided at a perpendicular longitudinal distance of 2 inches from the lateral axis [5] passing through the second opening [118]. Also, each of the three footrests [104a], [104b], and [104c] includes a top surface [122] provided at a vertical distance from the top of the front extended region [112] of the toilet pot [102]. Further, the three footrests [104a], [104b], and [104c] are provided in either of removable or folded configuration relative to each other, such that an appropriate footrest amongst the three footrests [104a], [104b], and [104c] is used, based on user requirement. For example, based on users' size, one or more of the three footrests [104a], [104b], and [104c] may be selected, to provide proper comfort while still facilitating complete defecation. With such alternate embodiment of the toilet arrangement [100] as well, the person is supported in the natural squatting position (torso bend of 22. 5 degrees, hip-flex of 45 degrees, and push away force on buttocks of the user). In such position, the puborectalis muscle [202] of the user is relaxed and the anal canal [206] of the user is completely vertically aligned with the rectum [204] of the user. This provides relatively lesser strain for complete defecation and thus chances of such diseases is eliminated. Also, as the buttocks of the user experience the push away force, constriction of one or more muscles is highly reduced, assisting in complete defecation.

While the preferred embodiments of the present invention have been described hereinabove, it should be understood that various changes, adaptations, and modifications may be made therein without departing from the spirit of the invention and the scope of the appended

claims. It will be obvious to a person skilled in the art that the present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive.

List of Components:

100 – Toilet Arrangement

102 – Toilet Pot

104 – Elongated Footrests

106 – Lumbar Support

108 – Base

110 – Oval Seat Section

112 – Front Extended Portion

114 – Rear Seat Portion

116 – First Opening

118 – Second Opening

120 – Rear End

122 – Top Surface

124 – Convex Support Surface

3 – Longitudinal Axis of 112

7 – Longitudinal Axis of 104

5 – Lateral Axis of 116

9 – Vertical Axis

200 – Anus region

202 – Puborectalis Muscle

204 – Rectum

206 – Anal Canal

We Claim:

1. A toilet arrangement [100], comprising:

a toilet pot [102], including:

an oval seat section [110], including:

a front extended portion [112] defining a first opening [116] and a longitudinal axis; and

a rear seat portion [114] including a spherically convex support surface [124] with a second opening [118] and a lateral axis [5] passing through the second opening [118];

at least two elongated footrests [104], each defined on each side of the toilet pot [102] and including:

a rear end [120] provided at a perpendicular distance of 2 inches from the lateral axis [5] passing through the second opening [118]; and

a top surface [122] provided at a vertical distance of 3.5 inches from a top of the front extended region [112],

wherein a longitudinal axis [7] of each of the at least two elongated footrests [104] is inclined relative to the longitudinal axis [3] of the front extended region [112] at an angle of 30 degrees; and

a lumbar support [106] provided rearward to the toilet pot [102], the lumbar support [106] being inclined at an angle of 22.5 degrees relative to a vertical axis [9],

wherein the toilet arrangement [100] facilitates a user to take a natural squatting position while supported on the toilet arrangement [100].

2. The toilet arrangement [100] as claimed in claim 1, wherein in the natural squatting position of the user,

the at least two footrests [104] support foots of a user inclined at an angle of 60 degrees from each other, positioned at a vertical distance of 3.5 inches from a top of the front extended region [112], and an ankle region of the foots of the user positioned at a

perpendicular distance of 2 inches from the lateral axis [5] passing through the second opening [118],

the rear seat portion [114] of the oval seat section [110] supports buttocks of the user above the spherically convex surface [124], and

the lumbar support bends the lumbar of the user at an angle of 22.5 degrees relative to thighs of the user.

3. The toilet arrangement [100] as claimed in claim 2, wherein in the natural squatting position of the user,

the lumbar support [106] bends the lumbar of the user at an angle of 22.5 degrees relative to thighs of the user,

the at least two footrests [104] support foots of a user, such that the buttocks of the user undergoes a hip-flex of 45 degrees, and

the rear seat portion [114] of the oval seat section [110] supports buttocks of the user above the spherically convex surface [124], such that buttocks of the user receives a push away force.

4. The toilet arrangement [200] as claimed in claim 3, wherein in the natural squatting position rectum [204] of the user is vertically aligned with anal canal [206] of the user.

5. The toilet arrangement [100] as claimed in claim 1, wherein the toilet pot [102], the at least two elongated footrests [104], and the lumbar support [106], are formed as a single integral component.

6. The toilet arrangement [100] as claimed in claim 1, wherein the toilet pot [102], the at least two elongated footrests [104], and the lumbar support [106], are formed as separate components and suitably arranged to form the toilet arrangement [100].

7. The toilet arrangement [100] as claimed in claim 1, wherein the at least two footrests [104] comprises of a plurality of footrests [104a], [104b], and [104c], defined on each side of the

toilet pot [102] and vertically stacked above each other, each of the plurality of footrests [104[including:

a rear end [120] provided at a perpendicular distance of approximately 2 inches from a lateral axis [5] passing through the second opening [118];

a top surface [122] provided at a vertical distance from a top of the front extended region [112],

wherein the vertical distance is different for each of the plurality of footrests [104a], [104b], and [104c].

8. The toilet arrangement [100] as claimed in claim 7, wherein the plurality of footrests [104] are in either of a folded arrangement and a removable arrangement relative to the toilet pot [102], such that one or more of the plurality of footrests [104a], [104b], and [104c], can be either of folded and removed for using a footrest having the vertical height optimum for the user.

9. The toilet arrangement [100] as claimed in claim 1, wherein the rear seat portion [114] is provided as an integral component relative to the toilet pot [102].

10. The toilet arrangement [100] as claimed in claim 1, wherein the rear seat portion [114] is provided a separate component relative to the toilet pot [102], such that the rear seat portion [114] is pivotally attached to the toilet pot [102].

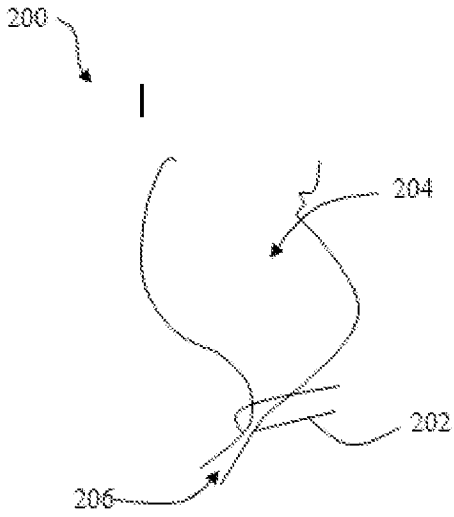
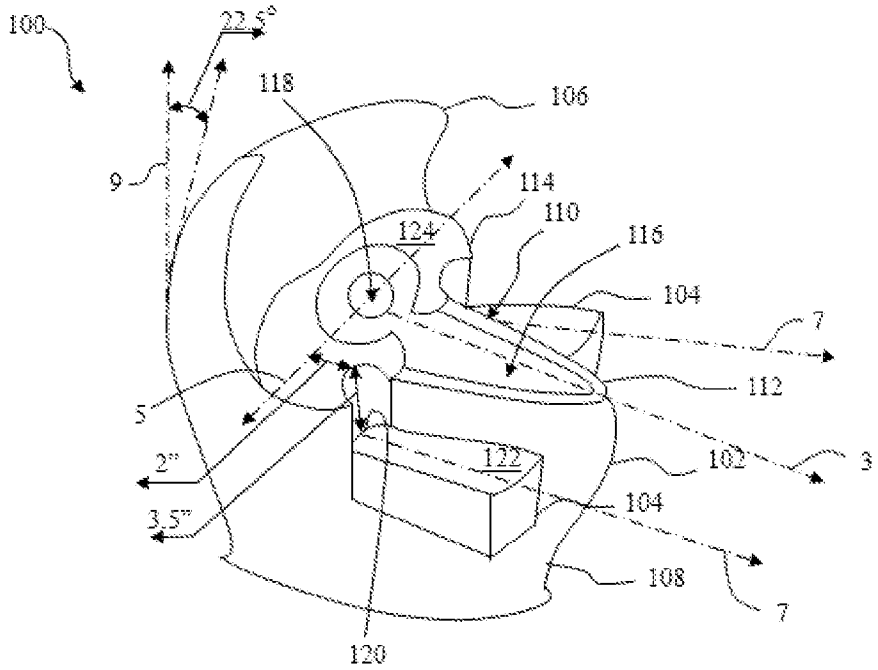


FIG. 1
(PRIOR ART)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2"
122
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3
3.5"
104
108
7
120

FIG. 2

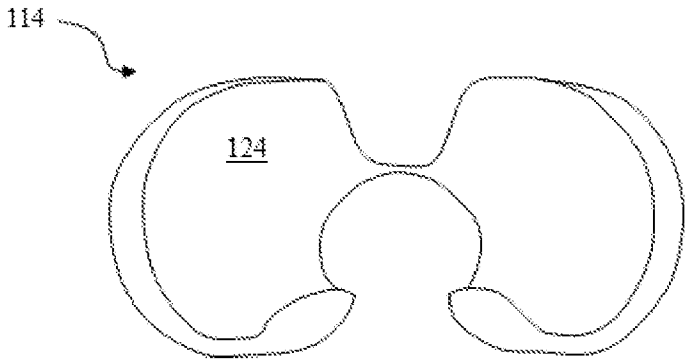

FIG. 3

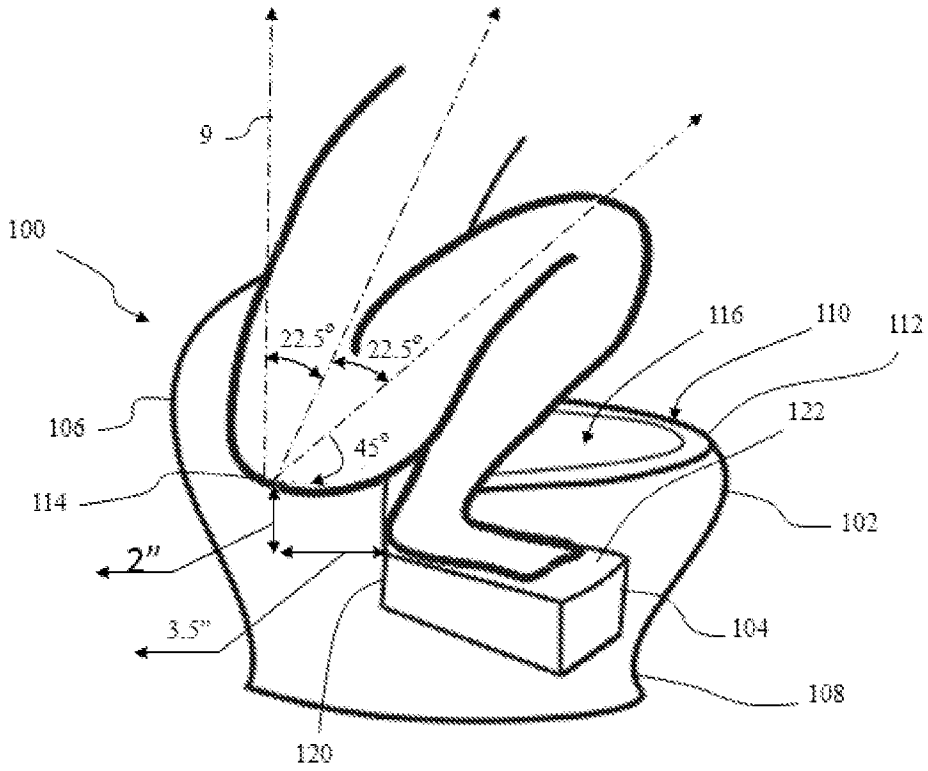

FIG. 4

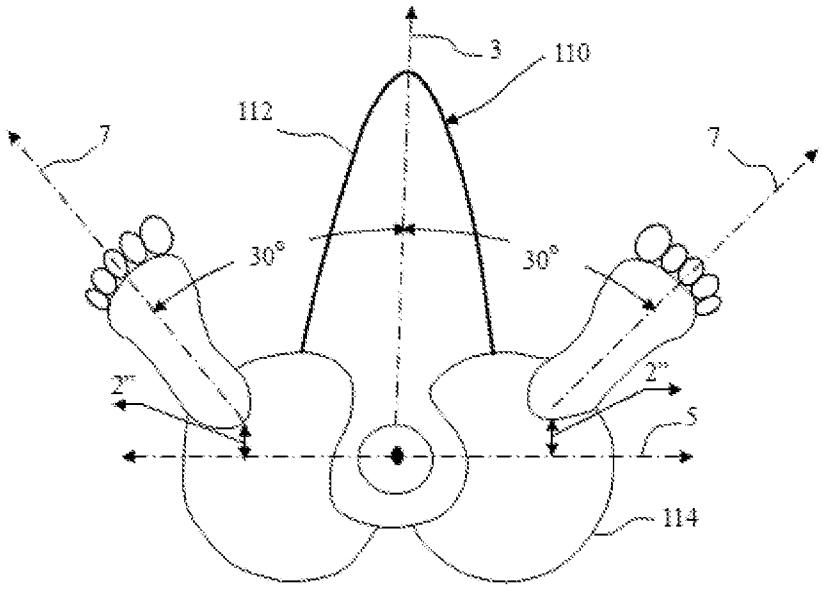

FIG. 5

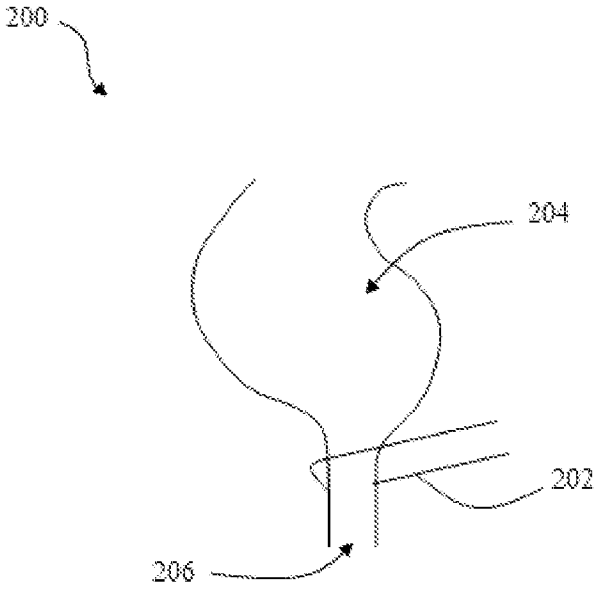

FIG. 6

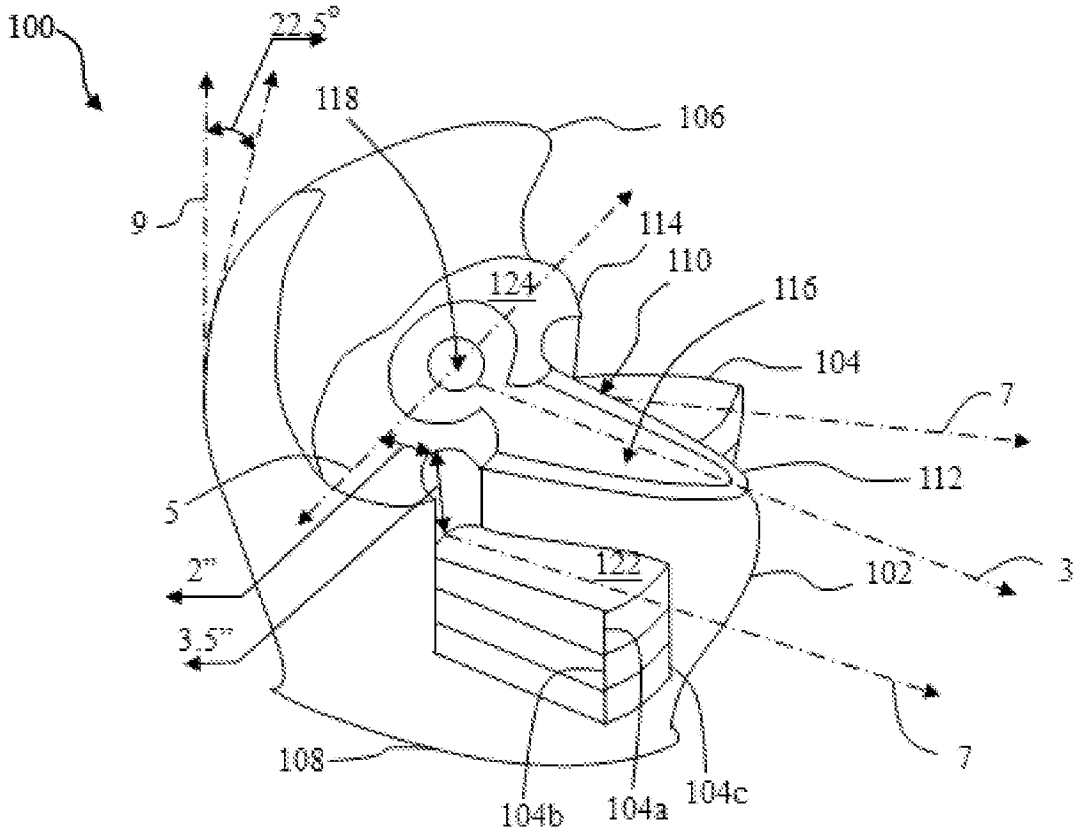
100
22.5°
118
106
9
114
110
124
116
104
7
112
5
122
102
3
2"
3.5"
7
108
104b
104a
104c

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IN2019/050498

A. CLASSIFICATION OF SUBJECT MATTER
A47K17/02,E03D11/00 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)

A47K, E03D

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	WO2017178873A1 (MURALIDHARAREDDY KALIMI et. al.) 19 October 2017 (19-10-2017) Abstract; paragraphs [0032] - [0045]; Figures 1-6	1-6
Y	Abstract; paragraphs [0032] - [0045]; Figures 1-6	7-10
Y	US6631524B1 (DIXON MARCIA A) 14 October 2003 (14-10-2003) Abstract; column 3 line 4-14; Figures 1, 4	7-8
Y	US20150196178A1 (ALBI DESIGN I LLC) 16 July 2015 (16-07-2015) Abstract; paragraph [0055]; Figures 17-23	9-10

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

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"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
27-09-2019	27-09-2019
Name and mailing address of the ISA/ Indian Patent Office Plot No.32, Sector 14,Dwarka,New Delhi-110075 Facsimile No.	Authorized officer Ashwin Sharma Telephone No. +91-1125300200

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/IN2019/050498

Citation	Pub.Date	Family	Pub.Date
WO 2017178873 A1	19-10-2017	IN 201641012892 A	13-05-2016
US 2015196178 A1	16-07-2015	US 2014130244 A1	15-05-2014