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Patent Office  
Office européen  
des brevets



(11)

EP 2 050 882 A1

(12)

**EUROPEAN PATENT APPLICATION**  
published in accordance with Art. 153(4) EPC

(43) Date of publication:  
**22.04.2009 Bulletin 2009/17**

(51) Int Cl.:  
**E03D 11/02 (2006.01)**      **E03D 11/13 (2006.01)**

(21) Application number: **07791064.4**

(86) International application number:  
**PCT/JP2007/064326**

(22) Date of filing: **20.07.2007**

(87) International publication number:  
**WO 2008/010570 (24.01.2008 Gazette 2008/04)**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE  
SI SK TR**  
Designated Extension States:  
**AL BA HR MK RS**

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(30) Priority: **20.07.2006 JP 2006198177**

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(54) **TOILET**

(57) A toilet having a reduced number of parts and low cost is provided. The toilet includes: a skirt section (1) molded of a synthetic resin; a bowl section (5) placed inside of the skirt section (1); and a toilet-seat placement section (6) joined to the upper portion of the skirt section (1) and having a toilet-seat placement surface on which a toilet seat is placed. The bowl section (5) and the toilet-seat placement section (6) are molded of a synthetic resin into a single member. This reduces the number of parts of the toilet.

**FIG. 1A**

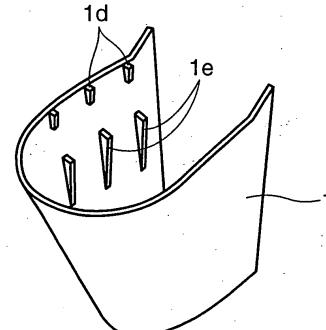
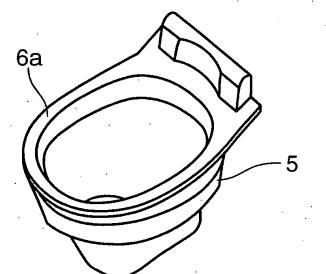
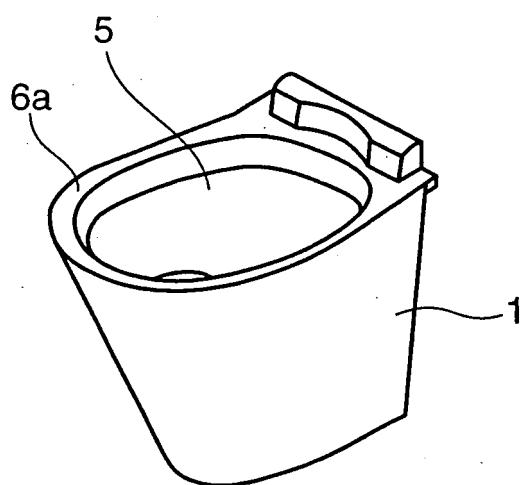


FIG. 1B



## Description

### Technical Field

**[0001]** The present invention relates to a toilet constituted by a plurality of synthetic-resin parts.

### Background Art

**[0002]** There is conventionally known a toilet constituted by a plurality of parts as shown in Patent Document 1. The toilet comprises three parts: a skirt section, a bowl section placed inside the skirt section and a rim section opening downward. The bowl section has an upper end which protrudes outward to be joined to the upper end of the skirt section. The rim section is placed so as to cover the upper end of the bowl section and joined to the bowl section and an upper portion thereof.

**[0003]** Since this toilet comprises the three parts -- the skirt section, bowl section and rim section --, a large number of metal molds for molding the parts and numerous junction places of the parts are required, which results in high cost for the toilet.

Patent Document 1: Japanese Patent Publication No. 3436004

### Disclosure of the Invention

**[0004]** In order to solve the above problems, it is an object of the present invention to provide a toilet having a reduced number of parts and low cost. To accomplish the object, a toilet according to the present invention includes: a skirt section molded of synthetic resin; a bowl section placed inside the skirt section; and a toilet-seat placement section joined to the upper portion of the skirt section and having a toilet-seat placement surface on which a toilet seat is placed, the bowl section and the toilet-seat placement section being molded of synthetic resin into a single member.

**[0005]** In this toilet, the bowl section and the toilet-seat placement section are molded of synthetic resin into a single member, thus reducing the number of parts compared with a conventional toilet in which a bowl section and a toilet-seat placement section are molded as a separate member from each other respectively. The reduction of the number of the parts reduces the number of metal molds for molding the respective parts and the number of places where the parts are joined to each other, thereby cutting down the cost of the toilet.

### Brief Description of the Drawings

#### **[0006]**

Fig. 1A is a perspective exploded view of a skirt section and a bowl section in a toilet according to an embodiment of the present invention, and Fig. 1B is a perspective view of the assembled skirt section

and the bowl section.

Fig. 2 is a sectional view showing a first form of the junction of the skirt section and the bowl section.

Fig. 3 is a sectional view showing a second form of the junction of the skirt section and the bowl section.

Fig. 4 is a sectional view showing a third form of the junction of the skirt section and the bowl section.

Fig. 5 is a sectional view showing a forth form of the junction of the skirt section and the bowl section.

Fig. 6 is a sectional view showing a fifth form of the junction of the skirt section and the bowl section.

Fig. 7 is a sectional view showing a sixth form of the junction of the skirt section and the bowl section.

Fig. 8 is a sectional view showing a seventh form of the junction of the skirt section and the bowl section.

### Preferred Embodiment for Implementing the Invention

**[0007]** There will be below described a preferred embodiment for implementing the present invention in detail with reference to the drawings.

**[0008]** A toilet according to this embodiment includes a skirt section 1 and a bowl section 5 shown in Figs. 1A and 1B. Fig. 1A is a perspective exploded view of the skirt section 1 and the bowl section 5, and Fig. 1B is a perspective view of the assembled skirt section 1 and bowl section 5. The skirt section 1 is shaped to enclose an inner space and, in this embodiment, open backward. The bowl section 5 is placed inside the skirt section 1 and also shaped to enclose an inner space; in this embodiment, substantially cylindrically shaped. The bowl section 5 is molded of synthetic resin integrally with a toilet-seat placement section described later (molded into a single member).

**[0009]** Both the skirt section 1 and the bowl section 5 are molded of synthetic-resin by injection molding, compression molding, vacuum forming or the like. As a material for molding, there is mainly and suitably used thermoplastic resin, for example, PP of a chemical resistance, an acrylic resin of a considerable strength, ABS or PET provided with a reinforcement material or the like. Each molded part preferably has a thickness of 3 to 10 mm. The parts are preferably annealed because they are relatively large so that a residual stress easily remains therein when they are welded together. Each molded part may be coated with a generally-used hard coating material for improvement of the surface quality.

**[0010]** The skirt section 1 and the bowl section 5 can be joined together in various forms. Some examples of the junction forms are illustrated in Figs. 2 to 8.

**[0011]** Fig. 2 shows a first form of the above junction. In this form, the bowl section 5 is integrally formed with a rim section 6 having a surface for placing a toilet seat at an upper-end portion of the bowl section 5, and the rim section 6 is joined to an upper portion 1b of the skirt section 1.

**[0012]** The rim section 6 includes an upper wall 6a, an inner wall 6b extending downward from an inner end of

the upper wall 6a and a lower wall 6c extending outward from a lower end of the inner wall 6b. The upper wall 6a, inner wall 6b and lower wall 6c enclose a hollow portion 7.

**[0013]** The upper wall 6a has a flat top surface on which a toilet seat (not shown) is placed, thus corresponding to a toilet-seat placement section forming a toilet-seat placement surface. The upper wall 6a has an outer end 6d protruding outwardly beyond the lower wall 6c, which is placed on an upper-end portion 1a of the skirt section 1. The upper surface of the upper-end portion 1a is joined to an under surface of the outer end 6d by welding or the like.

**[0014]** The bowl section 5 includes, in addition to the rim section 6, an intermediate wall 5g extending downward from the lower surface of the lower wall 6c, and a body wall 5a protruding slightly inward from the intermediate wall 5g and extending downward from there. The outer end of the lower wall 6c forms a convex portion 6e protruding outwardly beyond the intermediate wall 5g over the full circumference. Involving contact of the convex portion 6e with the inner surface of the skirt section 1, the upper surface of the upper-end portion 1a is joined to the under surface of the outer end 6d. The lower wall 6c, the intermediate wall 5g and the upper-end portion of the body wall 5a form an annular concave portion 5f denting outward.

**[0015]** The bowl section 5 allows washing water for washing the inner surface thereof to flow in the hollow portion 7 and further swirl in the annular concave portion 5f.

**[0016]** The toilet consists of the two synthetic-resin parts -- the skirt section 1 and the bowl section 5 integrally formed with the rim section 6 including the toilet-seat placement section, thereby requiring fewer metal molds for molding each part than a conventional toilet in which a skirt section, a bowl section and a rim section are formed as respective separate parts from each other. Moreover, the conventional toilet requires at least two junctions among the three component parts, while the toilet shown in Figs. 1 and 2 requires only one junction between the skirt section 1 and the bowl section 5 at one place (that is a place where the upper-end portion 1a of the skirt section 1 makes contact with the outer end 6d of the upper wall 6a of the rim section 6 in the bowl section 5 shown in Fig. 2).

**[0017]** In short, the toilet requires a reduced number of metal molds and parts-junction places, which cuts down its cost.

**[0018]** Furthermore, in the toilet, the lower surface of the outer end 6d in the upper wall 6a of the rim section 6 is placed and joined onto the upper-end portion 1a of the skirt section 1, which allows a seating road applied onto the rim section 6 to be borne by the upper-end portion 1a of the skirt section 1. This enhances the rigidity of the upper wall 6a as the toilet-seat placement section.

**[0019]** Fig. 3 shows a second form of the junction of the skirt section 1 and the bowl section 5. In Fig. 3, the skirt section 1 includes an upper portion 1b of less thick-

ness than a portion thereunder, and the thickness difference between the above two portions forms a step portion 1c on an inner surface of the skirt section 1. The step portion 1c locks the convex portion 6e of the rim section 6 in the bowl section 5 thereon, involving contact of an outer surface of the intermediate wall 5g of the bowl section 5 with the inner surface of the skirt section 1.

**[0020]** In this junction form, the convex portion 6e constitutes a supported portion locked on the step portion 1c of the skirt section 1 (i.e., supported from underside). Locking the convex portion 6e by the step portion 1c allows the step portion 1c of the skirt section 1 to bear a seating load applied onto the rim section 6, thereby further enhancing the rigidity of the upper wall 6a as the toilet-seat placement section. Furthermore, the contact of the outer surface of the intermediate wall 5g of the bowl section 5 with the inner surface of the skirt section 1 prevents a displacement of the bowl section 5 from the skirt section 1.

**[0021]** Fig. 4 shows a third form of the junction of the skirt section 1 and the bowl section 5. The rim section 6 in this junction form is integrally formed with a plurality of bowl-section ribs 6h. The bowl-section ribs 6h are vertically arranged, protruding outward from the outer surface of the inner wall 6b between an upper wall 6a and a lower wall 6c (i.e., protruding into the hollow portion 7). The bowl-section ribs 6h make contact with the inner surface of the upper portion 1b of the skirt section 1, thereby enhancing the rigidity of the rim section 6 including the upper wall 6a as the toilet-seat placement section.

**[0022]** Fig. 5 shows a fourth form of the junction of the skirt section 1 and the bowl section 5, in which the rim section 6 includes bowl-section ribs 6h of a triangle-shape in section. As shown in this, no limitation is set on the specific shape of the bowl-section rib 6h.

**[0023]** Fig. 6 shows a fifth form of the junction of the skirt section 1 and the bowl section 5. The bowl section 5 shown in Fig. 6, though including the intermediate wall 5g and the body wall 5a shown in Figs. 2 to 5, includes no rim section 6; a flat toilet-seat placement wall 5b is directly continued to the upper end of the intermediate wall 5g. In other words, the intermediate wall 5g is directly continued to an under surface of the toilet-seat placement wall.

**[0024]** The toilet-seat placement wall 5b has an outer end 5d protruding outward beyond the intermediate wall 5g, and the under surface of the outer end 5d is joined to the upper surface of the upper-end portion 1a of the skirt section 1, involving contact of the outer surface of the intermediate wall 5g with the inner surface of the skirt section 1.

**[0025]** In this toilet, the contact between the outer surface of the intermediate wall 5g and the inner surface of the skirt section 1 prevents a displacement of the bowl section 5 from the skirt section 1. Moreover, the direct continuity of the intermediate wall 5g and the toilet-seat placement wall 5b to each other allows a seating load applied onto the toilet-seat placement wall 5b to be borne

by not only the upper-end portion 1a of the skirt section 1 but also the intermediate wall 5g. This enhances the rigidity of the toilet-seat placement wall 5b.

**[0026]** Fig. 7 shows a sixth form of the junction of the skirt section 1 and the bowl section 5. In this form, there is added an inner wall 5c to the bowl section 5 shown in Fig. 6. The inner wall 5c connects an inner end of the intermediate wall 5g to the upper-end portion of the body wall 5a in a position apart inward from the intermediate wall 5g, and encloses a closed space, i.e. a hollow portion, in conjunction with the intermediate wall 5g, the toilet-seat placement wall 5b and the upper-end portion of the body wall 5a. The closed space is filled with a foamed material 8, which reinforces the upper portion of the bowl section 5 and enhances the rigidity of the toilet-seat placement wall 5b. This advantage can also be obtained by filling the hollow portion 7 shown in Figs. 2 to 5 with a foamed material.

**[0027]** Fig. 8 shows a seventh form of the junction of the skirt section 1 and the bowl section 5. In this form, the convex portion 6e shown in Fig. 2 is omitted, and the upper wall 6a is joined with the skirt section 1 involving contact of the outer surface of the intermediate wall 5g with the inner surface of the skirt section 1.

**[0028]** In the seventh form, the inner surface of the skirt section 1 is formed with a plurality of skirt-section ribs 1d and a plurality of skirt-section ribs 1e at a predetermined interval in the circumferential directions thereof. Each of the skirt-section ribs 1d has a shape to support the upper wall 6a of the rim section 6 in the bowl section 5 from underside and each of the skirt-section ribs 1e has a shape to support a step portion 5h formed at the upper end of the body wall 5a from underside. In other word, the step portion 5h constitutes a supported portion supported on the side of the skirt section 1 at a position far away downward from the upper wall 6a as the toilet-seat placement section.

**[0029]** The skirt-section ribs 1d and 1e support the skirt section 1 from underside to thereby enhance the rigidity of the upper wall 6a as the toilet-seat placement section, and further that of the whole skirt section 1.

**[0030]** As described so far, the present invention provides a toilet having a reduced number of parts and low cost. Specifically, the toilet according to the present invention includes: a skirt section molded of a synthetic resin; a bowl section placed inside the skirt section; and a toilet-seat placement section joined to the upper portion of the skirt section and having a toilet-seat placement surface on which a toilet seat is placed, in which the bowl section and the toilet-seat placement section are molded of a synthetic resin into a single member. Molding the bowl section and the skirt section of a synthetic resin in one piece reduces the number of component parts of the toilet seat, thereby reducing the number of metal molds required for molding each of the component parts and the number of places for junction of the component parts. This contributes to reduced cost of the toilet.

**[0031]** In the toilet according to the present invention,

it is more desirable that the outer end of the toilet-seat placement section is placed on the upper-end portion of the skirt section, and in this placement state, the outer end of the toilet-seat placement section is joined to the upper-end portion of the skirt section.

**[0032]** In the toilet according to the present invention, it is more preferable that the bowl section includes a convex portion protruding outward below the toilet-seat placement section, and the inner surface of the skirt is formed with a step portion locking the convex portion.

**[0033]** In the toilet according to the present invention, more desirably, the toilet-seat placement section may be joined to the skirt section involving contact of a portion of the bowl section under the toilet-seat placement with the inner surface of the skirt section. This contact prevents a displacement of the bowl section from the skirt section.

**[0034]** Specifically, it is preferable that the bowl section includes a convex portion protruding outward below the toilet-seat placement section to form a hollow portion between the toilet-seat placement section and the convex portion, and the toilet-seat placement section is joined to the skirt section involving contact of the convex portion with the inner surface of the skirt section.

**[0035]** In this case, more desirably, the bowl section may include a bowl-section rib protruding into the hollow portion from the outer surface of the wall between the toilet-seat placement section and the convex portion. The bowl-section rib enhances the rigidity of the upper-end portion of the bowl section including the toilet-seat placement section. Moreover, if the toilet-seat placement section and the convex portion are joined to each other involving contact of the bowl-section rib with the inner surface of the skirt section, the reinforcement effect is more enhanced.

**[0036]** The rigidity of the upper-end portion of the bowl section may be also enhanced by filling the hollow portion with a foamed material.

**[0037]** The bowl section may include an intermediate wall directly continued to a under surface of the toilet-seat placement section, and the toilet-seat placement section may be joined to the skirt section involving contact of the outer surface of the intermediate wall with the inner surface of the skirt section. The intermediate wall can bear a seating load applied onto the toilet-seat placement section, thus contributing an improved rigidity of the toilet-seat placement section.

**[0038]** The skirt section preferably includes a supporting portion supporting the bowl section from underside at a different position from that of the upper-end portion thereof. The supporting portion can further enhance the

rigidity for supporting the toilet-seat placement section.

**[0039]** Specifically, it is especially effective that: the bowl section includes a supported portion protruding outward below the toilet-seat placement section; and the supporting portion comes into contact with the supported portion from underside. The supporting portion can bear a seating load applied onto the toilet-seat placement section to enhance the rigidity of the toilet-seat placement section.

**[0040]** In this case, the supporting portion may be a step portion formed in the inner surface of the skirt section to lock the locked portion, or may comprise a plurality of skirt-section ribs protruding inward from the inner surface of the skirt section in a plurality of positions aligned in the circumferential directions of the skirt section respectively.

## Claims

### 1. A toilet, comprising:

a skirt section molded of a synthetic resin;  
 a bowl section placed inside the skirt section;  
 and  
 a toilet-seat placement section joined to the upper portion of the skirt section and having a toilet-seat placement surface on which a toilet seat is placed,  
 wherein the bowl section and the toilet-seat placement section are molded of a synthetic resin into a single member.

2. The toilet according to claim 1, wherein the toilet-seat placement section has an outer end placed on an upper-end portion of the skirt section, and, in this placement state, the outer end of the toilet-seat placement section is joined to the upper-end portion of the skirt section.

3. The toilet according to claim 2, wherein the outer end of the toilet-seat placement section protrudes outward beyond the other portion of the bowl section.

4. The toilet according to any of claims 1 to 3, wherein the toilet-seat placement section is joined to the skirt section involving contact of a portion of the bowl section under the toilet-seat placement section with the inner surface of the skirt section.

5. The toilet according to claim 4, wherein the bowl section includes a convex portion protruding outward below the toilet-seat placement section to form a hollow portion between the toilet-seat placement section and the convex portion, and the toilet-seat placement section is joined to the skirt section involving contact of the convex portion with the inner surface of the skirt section.

6. The toilet according to claim 5, wherein the bowl section includes a bowl-section rib protruding into the hollow portion from the outer surface of the wall between the toilet-seat placement section and the convex portion.

7. The toilet according to claim 6, wherein the toilet-seat placement section and the convex portion are joined to each other involving contact of the bowl-section rib with the inner surface of the skirt section.

8. The toilet according to claim 5, wherein the hollow portion is filled with a foamed material.

15 9. The toilet according to claim 4, wherein the bowl section includes an intermediate wall directly continued to a under surface of the toilet-seat placement section, and the toilet-seat placement section is joined to the skirt section involving contact of the outer surface of the intermediate wall with the inner surface of the skirt section.

10 10. The toilet according to any of claims 2 to 9, wherein the skirt section includes a supporting portion supporting the bowl section from underside at a different position from the position of the upper-end portion thereof.

11. The toilet according to claim 10, wherein:

30 the bowl section includes a supported portion protruding outward below the toilet-seat placement section; and  
 the supporting portion comes into contact with the supported portion from underside.

12. The toilet according to claim 11, wherein the supporting portion is a step portion formed in the inner surface of the skirt section to lock the locked portion.

35 13. The toilet according to any of claims 10 to 12, wherein the supporting portion comprises a plurality of skirt-section ribs protruding inward from the inner surface of the skirt section in a plurality of positions aligned in the circumferential direction of the skirt section respectively.

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FIG. 1A

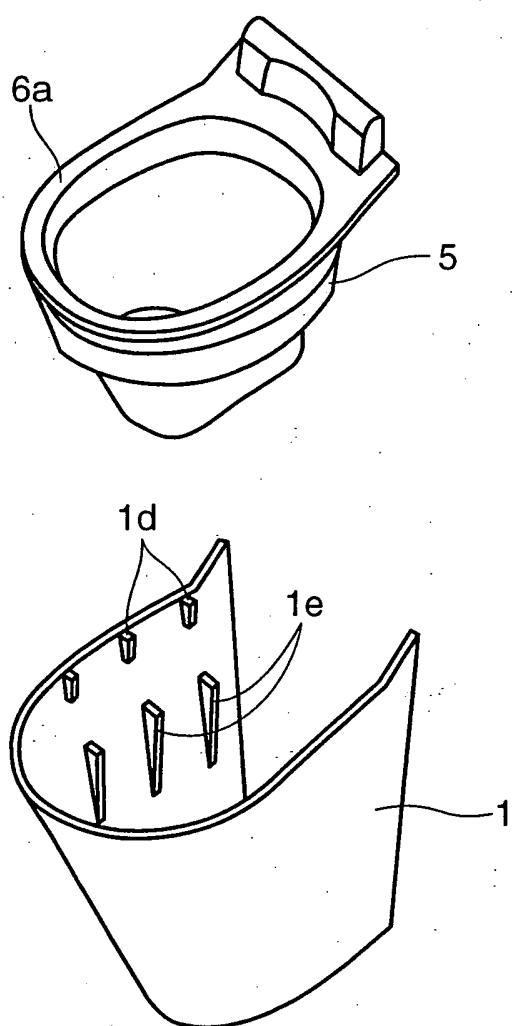


FIG. 1B

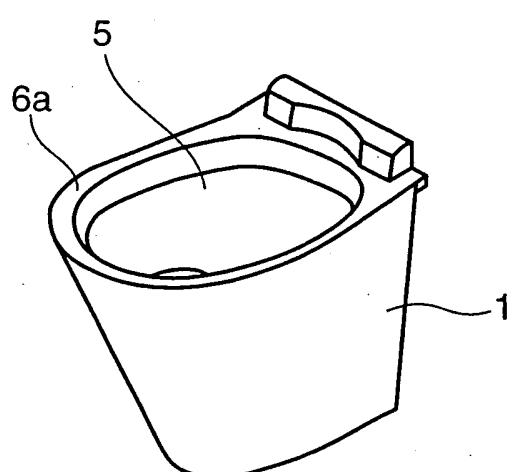


FIG. 2

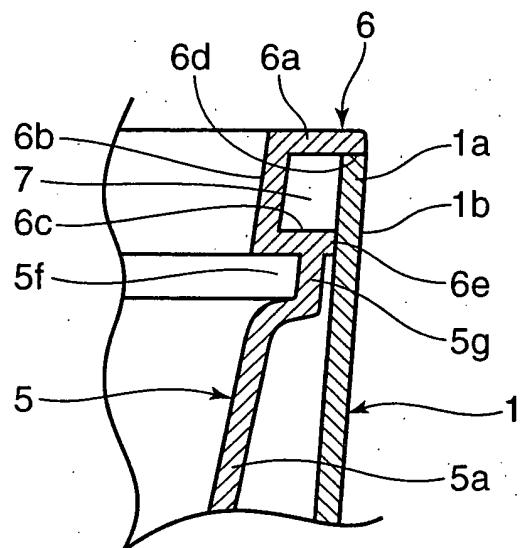


FIG. 3

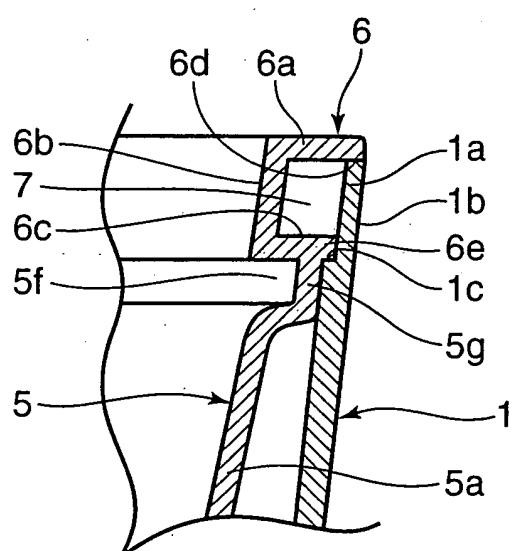


FIG. 4

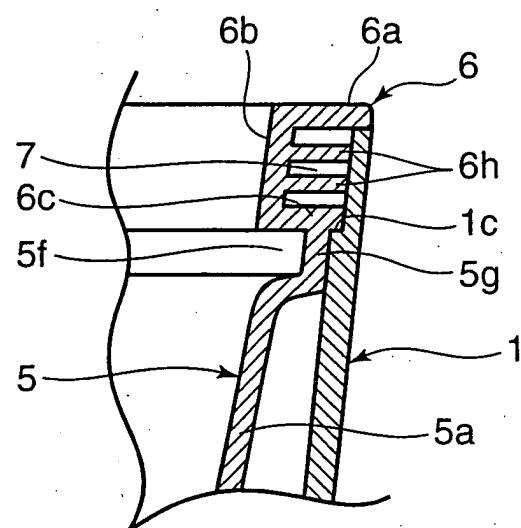


FIG. 5

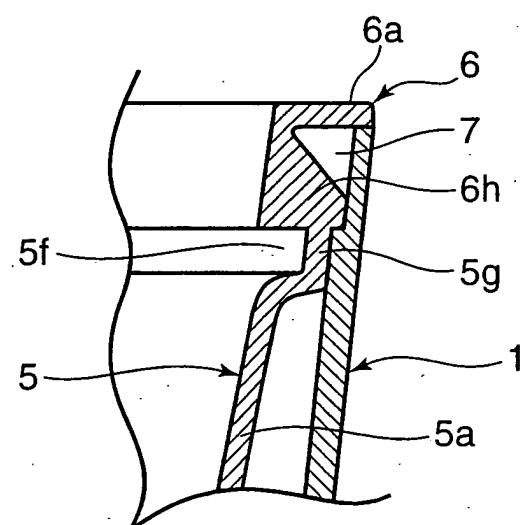


FIG. 6

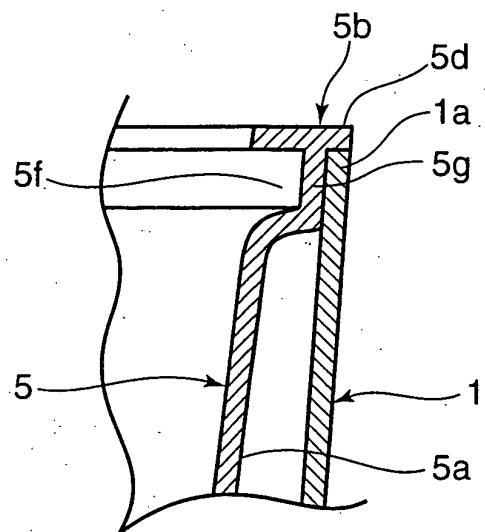


FIG. 7

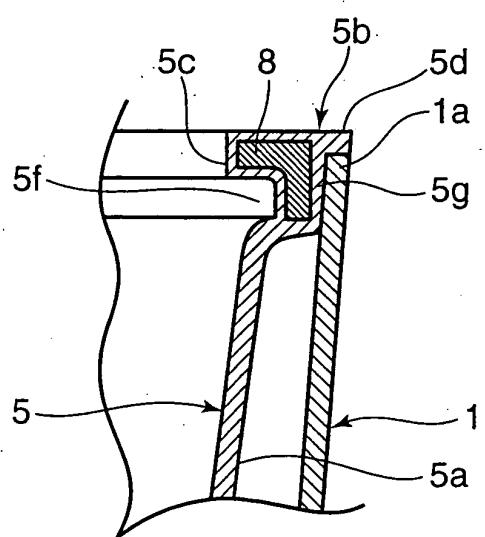
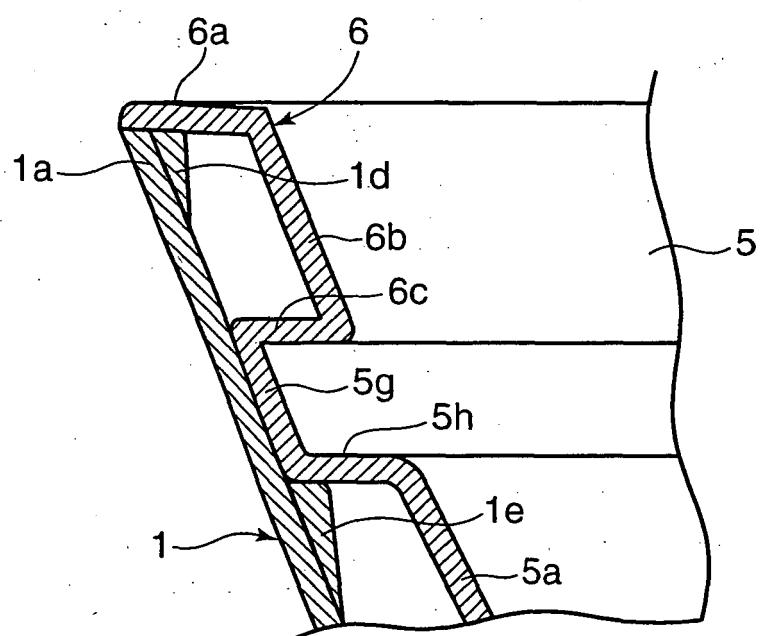


FIG. 8



INTERNATIONAL SEARCH REPORT		International application No. PCT/JP2007/064326
A. CLASSIFICATION OF SUBJECT MATTER E03D11/02 (2006.01) i, E03D11/13 (2006.01) i		
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) E03D11/02, E03D11/13		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2007 Kokai Jitsuyo Shinan Koho 1971-2007 Toroku Jitsuyo Shinan Koho 1994-2007		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	JP 2005-83085 A (Matsushita Electric Works, Ltd.), 31 March, 2005 (31.03.05), Par. Nos. [0013] to [0021]; Figs. 1, 4, 5 (Family: none)	1-3, 10 4-9, 11-13
Y A	WO 2004/022862 A1 (Toto Ltd.), 18 March, 2004 (18.03.04), Page 12, line 16 to page 14, line 9; Figs. 1 to 3 & US 2006/0005310 A1	1-4, 10 5-9, 11-13
Y	JP 9-144155 A (Minosuke KASATANI), 03 June, 1997 (03.06.97), Par. Nos. [0006] to [0008]; all drawings (Family: none)	1-4, 10
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> 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" earlier application or patent 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		
Date of the actual completion of the international search 04 October, 2007 (04.10.07)		Date of mailing of the international search report 16 October, 2007 (16.10.07)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2007/064326

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2000-54465 A (Toto Ltd.), 22 February, 2000 (22.02.00), Par. Nos. [0025] to [0040]; Figs. 1 to 3 (Family: none)	1
A	JP 2005-155136 A (Hiroshi FUJITA), 16 June, 2005 (16.06.05), Par. No. [0013]; Figs. 1, 2 (Family: none)	1

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2007/064326

## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 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 No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

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

The "bowl section (2)" and the "rim section (25)" in the invention disclosed in document 1 below correspond to the "bowl section" and the "toilet seat placement section" in the invention of claim 1; therefore, there is no difference between them.

The invention of claim 1 makes no contribution over the prior art and is not a special technical feature.

Since the inventions of claim 1, claims 2, 3, and 10-13, and claims 4-9 have no relationship including one or more of the same or corresponding special technical features, (continued to extra sheet)

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

- The additional search fees were accompanied by the applicant's protest and, where applicable, payment of a protest fee..
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/JP2007/064326

Continuation of Box No.III of continuation of first sheet(2)

they are no so linked as to form a single general inventive concept.

Document 1: JP 2005-83085 A (Matsushita Electric Works, Ltd.), 31 March 2005 (31.03.05), paragraphs [0013]-[0021], FIGs. 1, 4, and 5.

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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