



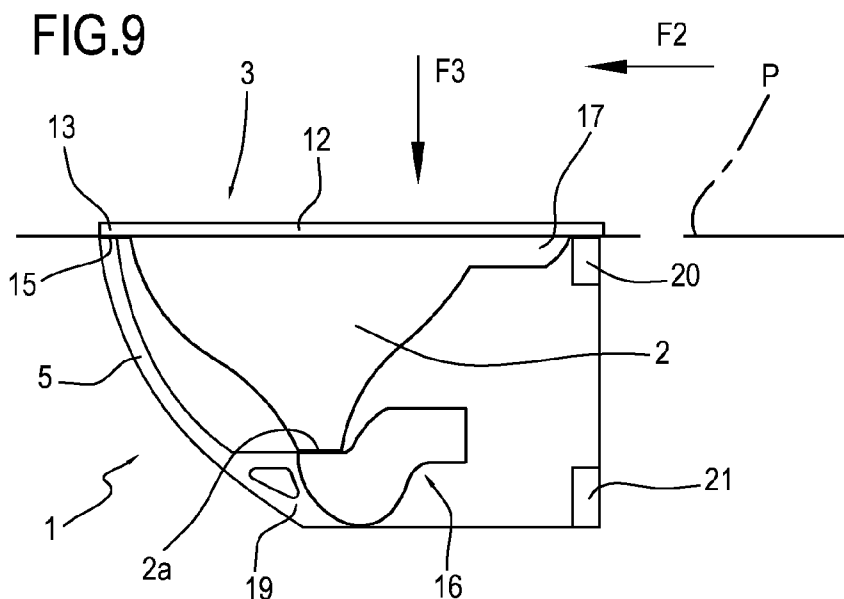
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(54) Title: CERAMIC TOILET BOWL



(57) Abstract: A ceramic bowl obtained by means of casting in moulds, comprises: a liquid collection pan (2); a siphon portion (16) for draining liquids from the pan (2); a liquid distribution rim (3) having at least one portion configured to reproduce the top edge (7) of the pan (2) along a common plane (P) of lie; the rim portion (3) has a toroidal cross-section generating a tubular chamber (4) for the passage of liquids; the rim (3) and the pan (2) being made as a single body in a mould (SI); an outer casing (5) for housing the pan (2) and the rim (3) in the form of a single body; the siphon portion (16) for draining liquids is separate from the pan (2), formed as a single body with the casing (5), and configured to be joined to the pan (2) inside said casing (5).



Description

Ceramic toilet bowl

Technical Field

The present invention relates to a ceramic toilet bowl.

Background Art

5 At present, a conventional ceramic bowl is obtained by pressure-casting a suspension referred to in the technical jargon of the sector as "slip".

The bowl is composed of two parts which are combined with each other: a first operative bottom part, or "active part", comprising a pan and a drainage siphon (namely the inner zones of the bowl), and a second top part or "rim".

10 In this connection, the first part, composed of the pan/siphon unit, constitutes the functional part of the bowl and must have dimensional characteristics which are suitable for ensuring correct operation of the bowl as a pan for collecting and discharging the liquid flow.

15 The rim has a portion thereof configured to reproduce the extension of the top edge of the pan which it covers (for example, but not necessarily, an ellipsoidal form) and a rear extended part which is parallel to the extension of the siphon and in which a through-hole for supplying the flushing water is formed.

This rim part may be made in two definite forms which are referred to in the technical jargon of the sector as "open rim" and "closed rim".

20 In the case of an open rim its portion covering the edge of the pan has a cross-section in the form of an overturned "U" with its bottom surface open so as to allow the passage of the flushing water.

25 In the case of a closed rim, instead, its portion covering the edge of the pan has a cross-section of the partially closed toroidal type in which, on the wall facing the pan, a plurality of convolutions or holes for discharging the water are formed.

In this connection, in the manufacturing technology based on the high-pressure casting of slip inside moulds, the pan/siphon (i.e. the active part) and rim are made separately (at least as regards the said closed rim).

30 Only subsequently are the rim and the active unit joined together by bonding the rim onto the top edge of the pan.

The joining operation is performed using the parts in a "fresh" state, i.e. when the parts still have a high percentage of water and have just been extracted from the mould. The reason why the parts are bonded in the fresh state is that, following bonding, the parts may undergo finishing (performed also using robot units) while ensuring a good surface continuity, i.e. an attractive appearance of the bowl.

In the current market there is an ever-increasing demand for toilet bowl designs which are such that large areas of the functional components (viz. pan/siphon) must be covered and essentially casings of different shapes and sizes must be provided in each case.

In order to be able to produce this type of bowl it is required to create moulds with very large and complex "free thickness" zones with consequent high costs and not insignificant problems from a technological point of view.

In fact, "free thickness" moulds allow maximum freedom as regards the aesthetic form of the articles, with different dimensional ratios inside the mould and, therefore, with the presence of large-volume casting cavities.

In this connection, the cavity inside the mould is not distinguished by a male/female mating arrangement (as in preset-thickness moulds), but the walls of the product are formed by a single internal surface of the mould.

Basically, therefore, the requirement for bowls with different aesthetic designs results in a reduction in standardization of the manufacturing parts with a corresponding diversification both of the mould types and the manufacturing operations with a possible increase in cost of the finished article.

The Applicant, in an attempt to respond to this demand more effectively, has devised a ceramic toilet bowl described in patent application EP 2017391.

In this solution the bowl comprises a first bottom part, which is composed of the liquid collection pan and a liquid-drainage siphon portion, and a second top part or rim, which is composed of the front portion forming the top edge of the pan and a rear extended part inside a liquid passage channel is provided.

The bowl is formed with the first and the second part as a single body inside the mould so as to define a single part to which a third covering part, or outer casing, is added, the latter housing the single part configured so as to be joined to the casing at least along the top edges of the latter.

With such a design of toilet bowl it is possible to manufacture a single standardized part comprising all the functional components of the product, while the aesthetic features of the final product are provided on the casing portion.

However, during the industrial implementation of this solution, a number of problems associated with the particular configuration of the rim and the consequent structural design of the moulds required to produce the bowl have arisen.

5 In particular, the configuration of the siphon and, secondarily, the perimetral form of the rim create particular undercuts or recesses in the form of the product such as to require the presence of at least three mould parts in order to obtain the part: two lateral half-moulds, configured to obtain the outer surface of the finished part, and a central piston/mould for closing the first two half-moulds
10 in order to produce the inner rim/pan part and siphon.

In addition it should be added that the mould may have up to four parts, for particular bowl designs, with the introduction of an insert which is separate from the lateral mould parts.

15 This mould is therefore managed, when opened and closed, by means of movements along a horizontal axis (first two lateral mould-halves) and along a vertical axis for the central piston/mould.

In this connection, therefore, the plant required to produce the bowl in question requires essentially at least two moulds consisting of three parts, each of which with a corresponding movement necessary for: forming the "active"
20 component (pan/siphon) /rim as one piece and a similar mould for the production of the casing.

The large number of said components thus complicates, increases the cost and also partly slows down the production of the bowl thus designed, cancelling out partly the advantages resulting from the standardization of the product thus
25 configured.

Aim of the Invention

The object of the present invention is to provide a ceramic bowl which overcomes the aforementioned drawbacks of the prior art.

30 In particular, an object of the present invention is to provide a ceramic bowl able to ensure standardized production of the functional components, simplifying the manufacture thereof.

A further object of the present invention is to propose a ceramic bowl which is able to ensure that its own production cycle may be performed more
35 rapidly and using less costly equipment required for this purpose.

Said objects are fully achieved by means of the ceramic bowl according to the present invention which is characterized by the contents of the claims provided below.

5 In particular, the ceramic bowl obtained by means of casting in moulds comprises a liquid collection pan with a main axis of extension, a siphon portion for draining the liquids from the pan; a liquid distribution rim with a portion configured to reproduce the top edge of the pan in a common plane of lie; the rim portion has a toroidal cross-section generating a tubular chamber for the passage of liquids having as axis of rotation the axis of the pan, and an outer casing which
10 houses the pan and the rim obtained as a single body.

According to the invention, the siphon portion for draining the liquids is separate from the pan, formed as a single body with the casing and configured to be joined to the pan inside said casing.

15 This measure allows simplification of the pan/rim unit being formed in the corresponding mould, owing to the elimination of surfaces generating undercuts inside the mould used to form the pan and rim.

Preferably, the siphon portion is formed as a single body with the casing.

20 With this solution formation of all the components of the bowl may be performed inside two moulds, the production of one functional component also being assigned to the casing mould.

Alternatively, the liquid-drainage siphon portion is always separate from the pan and also from the casing and is joined to the bottom of the said pan when the said pan, together with the rim, is housed inside the casing.

25 As a result of this further technical measure it is possible to choose subsequently the type of siphon which is to be applied to the bowl components already obtained.

30 Still according to the invention, the bowl has perimetral surfaces which define the tubular chamber of the rim and the surface joining together pan and rim portion and which extend in a direction transverse to the common plane of lie, having an extension configured to generate continuous outer surfaces which are devoid of cavities or projections extending in planes parallel to the common plane of lie and are oriented converging towards the main axis of extension of the pan.

35 Owing to the particular simplified constructional design of the rim and the pan part joined thereto with continuous surfaces which are devoid of cavities or projections extending substantially horizontally and are oriented towards the inside of the pan or the rim these two parts may be produced in a single mould consisting of only two parts and with a single opening and closing movement of

the mould which, in fact, is parallel to or coincides with the main axis of extension of the pan.

This particular configuration, therefore, simplifies the structure and speeds up the production cycle, ensuring optimum technical, functional and aesthetic features of the bowl.

In other words, there is an evolution in the design of the rim which is structured so as to have a particular linear geometry of the outer surfaces transverse to the plane of lie, resulting in a single direction of extraction of the pan/rim unit from the mould, i.e. along a single movement axis of the mould parts.

Preferably, the perimetral surfaces of the tubular chamber transverse to the common plane of lie have an extension parallel to each other and define the inner and outer side walls of the tubular chamber with respect to the pan.

Even more preferably, the surface section joining together pan and rim is also parallel to the two side walls of the rim.

In this connection, the three surfaces have an orientation converging towards the axis of extension of the pan, i.e. inclined towards the bottom of the pan.

Preferably, the tubular chamber of the rim has a bottom surface joined, at its end, to the pan joining surface so as to form, together with the said pan, a substantial right angle defining a projecting outer extended part of the pan itself.

Basically, the tubular chamber widens towards the outside of the pan and narrows partly towards the inside of said pan with a quadrangular configuration also defined by the two surfaces which are transverse to the axis of extension of the pan and are flat and devoid of substantially horizontal cavities or projections.

Preferably, the rim portion comprises a flange inside the pan, extending substantially vertically and defining the inner side surface of the tubular chamber.

In this connection, the flange is configured with its bottom free portion partially facing the top edge of the pan and the joining surface so as to define a channel for discharging liquid passing through the tubular chamber.

This design of the inner part of the tubular chamber combines the side closure of the tubular chamber with the formation of the fluid discharge channel by means of a linear structure devoid of undercuts, i.e. cavities and undercuts.

Preferably, moreover, the flange defining the side surface of the tubular chamber and the pan joining surface are configured to obtain dimensional variations in their relative distance so as to define narrower zones or wider zones of the liquid discharge channel.

In this connection, the pan joining surface is formed with an undulating form along its entire extension so as to vary the distance from the flange.

Preferably, by varying the undulation arc of the pan it is also possible to obtain an intermediate portion of the flange which is joined to a section joining together the bottom surface and the top edge of the pan so as to configure a closed zone along the extension of the tubular chamber, thereby defining a closed rim.

Preferably, the bottom surface of the tubular chamber comprises protrusions projecting towards the inside of the said tubular chamber for distributing the passing liquid.

This feature results in a further additional element inside the tubular chamber (constriction and channelling of the liquid passage) without affecting the outer perimetral form of the pan.

Brief Description of the Drawings

This feature, together with others, will emerge more clearly from the following description of a preferred embodiment illustrated purely by way of a non-limiting example in the accompanying sets of drawings in which:

- Figure 1 shows a schematic perspective view of a plant for the manufacture of the toilet bowl according to the present invention;
- Figure 2 shows a sectioned side view of a single-body pan and rim forming part of the toilet bowl in question inside the closed forming mould;
- Figure 3 shows a sectioned side view of the single-body pan and rim forming part of the toilet bowl in question inside the open forming mould;
- Figure 4 shows a perspective and partially sectioned view of the single-body pan with rim according to Figures 2 and 3;
- Figure 5 shows a partially sectioned, side perspective view of the toilet bowl according to the present invention;
- Figure 6 shows a sectioned front view of a detail of the tubular chamber of the rim according to Figure 4;
- Figure 7 shows a variation of embodiment, with respect to Figure 6, of a detail of the rim chamber;
- Figure 8 shows a different cross-sectional view of the rim chamber, compared to the preceding Figures 6 and 7, in which the projections inside the rim can be seen;
- Figures 9 to 11 show two different constructional configurations and corresponding different operative stages of manufacture of the toilet bowl, all the

figures being schematic side views with some parts removed so that other parts may be seen more clearly.

Detailed Description of the Preferred Embodiments of the Invention

5 According to the accompanying figures and with particular reference to Figures 2 to 5, the toilet bowl in question, denoted overall by 1, is made of ceramic material obtained by casting liquid (called "slip") in porous-resin moulds.

The bowl 1 comprises a liquid collection pan 2 having a main axis Z of extension, a siphon portion 16 for draining the liquids from the pan 2, and a liquid distribution rim 3 having a portion configured to reproduce the top edge 7 of the pan 2 to which it is joined along a common plane P of lie.

"Main axis of extension" is understood as meaning the longitudinal axis Z of extension of the pan 2 which is composed of a top portion with a broad cross-section extending as far as a bottom or base portion with a narrower cross-section than the previous portion.

In this connection, the rim portion 3 has a toroidal cross-section generating a tubular chamber 4 for the passage of liquids having as axis of rotation generating the aforementioned toroid the aforementioned main axis Z of extension of the pan 2.

20 The rim 3 and the pan 2 are formed as a single body in a single mould S1 (as also illustrated in patent application EP 2017391 in the name of the same Applicant).

The bowl 1 comprises an outer casing 5 which houses the pan 2 and the rim 2 in the form of a single body (this characteristic feature is also illustrated in patent application EP 2017391).

Preferably, the casing 5 houses and covers completely the pan 2, while a part of the rim 3 (the top part) remains visible and partly outside of the casing 5.

30 According to the invention, the bowl 1 comprises the siphon portion 16 for draining the liquids from the pan 2 separate from the pan 2 itself and configured to be joined to the bottom of the pan 2 housed inside the casing 5.

Owing to this division of the siphon component 16 from the pan 2 the structure of the mould S1 in which pan 2 and rim 3 are formed is simplified.

In this connection, the bowl 1 in question comprises the siphon portion 16 for draining the liquids from the pan 2 which is made as a single body with the casing 5 (Figure 9).

35 Preferably, this siphon portion 16 is formed on the bottom of the casing 5.

This feature results in further simplification in the initial configuration of the components of the bowl 1 and therefore of the plant.

Moreover, this feature increases the speed of assembly of the components of the bowl 1, making use of the step involving insertion of the pan 2 with rim 3 inside the casing 5 and the corresponding joining of the bottom 2a of the pan 2 to the siphon portion 16.

Preferably, the siphon portion 16 is produced together with a reinforcing rib 19 inside the casing 5.

This rib 19, together with a rear bracket 20 and rib 21, also have the function of partially supporting the pan 2 and part of the rim 3 inside the said casing 5.

Alternatively (see Figures 10 and 11 showing two different configurations of the siphon portion) the bowl 1 comprises the siphon portion 16 for draining the liquids from the pan, which is separate from the pan 2 and joined to the bottom of the said pan 2 housed inside the casing 5.

In this case, the siphon portion 16 is obtained separately from the components of the bowl 1 and then applied to the bottom of the pan 2 already housed inside the casing 5.

This feature allows the type of siphon duct 16 which is to be inserted inside the bowl 1 to be chosen subsequently.

The zones of contact between siphon portion 16 and bottom of the pan 2 are configured so as to fit together during the final assembly operation.

In this connection, the pan 2 is open on its bottom 2a and/or on its side surface 2b depending on the type of siphon portion 16 fitted, i.e. the connection opening present on the siphon portion 16.

Still according to the invention, the perimetral surfaces 8, 14 which define the tubular chamber 4 of the rim 3 and the surface 31 joining together pan 2 and rim portion 3 and which extend in a direction transverse to the common plane P of lie have an extension configured to generate continuous outer surfaces which are devoid of cavities or projections extending in planes parallel to the common plane P of lie and are oriented so as to converge towards the main axis Z of extension.

In other words, the two surfaces of the rim 3 defining the outer side 14 and inner side 8 of the tubular chamber 4 and the surface 31 joining together pan 2 and rim 3 have a linear extension inclined towards the centre of the pan 2.

Preferably, these three surfaces 8, 14 and 31 are substantially parallel to each other.

Preferably, the volume of the tubular chamber 4 is partly obtained also by the joining surface 31 defining the top edge 7 of the pan 2 and the rim 3.

In this connection, in fact, the joining surface 31 is joined, without interruption, to the bottom surface 6 of the rim 3 so as to produce a projection of the edge of the pan 3 towards the outside of the said pan 2.

Owing to this geometric feature described hitherto, the configuration of the tubular chamber 4 is obtained with a substantially quadrangular cross-section devoid of cavities or projections formed directed horizontally both towards the inside and towards the outside of the pan 2.

As a result of these geometrical features it is possible to produce pan 2 and rim 3 in a two-part mould in which there is a single direction of opening of the two parts: namely perpendicular to the common plane P of lie of the pan 2 and rim 3 and parallel to main axis Z of extension of the pan 2.

This direction of opening coincides with the main axis Z of extension.

Preferably, the rim 3 comprises the tubular chamber 4, the bottom end surface 6 of which is joined, at its end, to the joining surface 31 (in particular to the top edge 7 thereof) of the pan 2 so as to form a substantial right angle α which defines a projecting outer extended part of the pan 2 itself (see Figure 6).

Preferably, the rim portion 3 comprises a flange 8 inside the pan 2 (defining one of the surfaces transverse to the common plane P of lie), extending substantially vertically and defining the inner side surface of the tubular chamber 4.

In this connection, the flange 8 is configured with its bottom free portion partially facing the top edge 7 and the joining surface 31 of the pan 2 so as to define a discharge channel 9 for liquid passing through the tubular chamber 4.

More particularly, the flange 8 extends beyond the top edge 7 of the pan 2 so as to face also a bottom portion of the joining surface 31 of the pan 2 at a constant distance so that the liquid discharge channel 9 is defined longer in order to direct better the said outgoing liquid.

Alternatively, the flange 8 and the joining surface 31 of the pan 2 are configured to obtain dimensional variations in their relative distance so as to define narrower zones or wider zones of the liquid discharge channel 9.

This design detail is obtained by providing the joining surface 31 of the pan 2 with an undulating form.

In an alternative non-limiting solution, this design is obtained by varying the angle β of inclination with which the flange 8 is formed with respect to the top wall 12 of the tubular chamber 4.

In both the possibilities described, the inner flange 8 of the tubular chamber 4 has an intermediate portion 10 thereof which is joined to a section joining together bottom surface 6 and the top edge 7 of the pan 2 so as to configure a closed zone along the extension of the tubular chamber 4: this zone, alternating with open zones of the tubular chamber 4, defines a closed rim (see Figure 7).

Preferably, the bottom surface 6 of the tubular chamber 4 comprises protrusions 11 projecting towards the inside of the said tubular chamber 4 for distributing the passing liquid (see Figure 8).

In this connection, the protrusions 11 are distributed along the entire tubular chamber 4 alternating with linear sections of the bottom surface 6.

This configuration of the bottom of the tubular chamber 4 allows controlled constriction and distribution of the passing liquid in such a way as to optimize its distribution along the entire chamber 4 and therefore along the inner wall of the pan 2.

Preferably, the rim portion 3 comprises the surface 12 defining the top wall of the tubular chamber 4 provided with a flange 13 projecting from the outer side surface 14 of the tubular chamber 4.

In this connection, the projecting flange 13 defines a surface for resting the rim 3 on the top surface 15 of the casing 5.

Still in this connection, the flange 13 forms an angle δ with the outer side wall 14 and is substantially parallel to the bottom surface 6 of the tubular chamber 4.

Preferably, the rim 3 comprises a second rear portion 17 which is defined by an extended part of the portion generating the tubular chamber 4 and inside which a liquid supply channel 18 for the tubular chamber 4 is formed.

The present invention also provides a method for manufacturing the toilet bowl 1.

The method comprises the following steps:

- 30 - providing a first mould S1 for forming the combined pan 2 and rim 3, composed of two parts, i.e. bottom part and top part, which are movable so as to be opened and closed along an axis perpendicular to the common plane P of lie of the top edge 7 of the pan 2 and the rim portion 3 and parallel to the main axis Z of extension (see Figures 1 and 2);
- 35 - forming, by means of casting in the first mould S1 consisting of two parts, the pan 2 and the rim 3 as a single body;
- providing a second mould S2 for forming the casing 5 (see Figure 1);

- forming the casing 5 by means of casting inside the second mould S2;
- raising the top part of the first mould S1 in order to extract the pan 2 and the rim 3 from the mould (see Figure 3 and arrow F1);
- opening the second mould S2 in order to prepare the casing 5 for housing the pan 2 and rim 3 joined together;
- inserting and resting the pan 2 and rim 3 inside the casing 5 (see Figures 9 to 11 and arrows F2 and F3);
- joining the drainage siphon portion 16 to the bottom of the pan 2.

Preferably, this joining step is performed following insertion of the pan 2 and rim 3 inside the casing 5.

Alternatively, the step of forming the casing 5 inside the second mould S2 comprises the simultaneous formation of a siphon portion 16 for draining liquids from the pan 2.

Preferably, the method comprises a step of applying adhesive to the top edge of the siphon portion 16 (for example "slip" with a higher percentage water content).

Alternatively, the method comprises the further steps of:

- providing a third mould S3 for forming a liquid-drainage siphon portion 16 for the bottom of the pan 2;
- forming the drainage siphon portion 16 by means of casting inside the third mould S3,
- housing the drainage siphon portion 16 inside the casing 5 following insertion of pan 2 and rim 3 inside the casing 5 (see arrow F4 in Figure 10);
- joining the siphon 16 to the bottom 2a of the pan 2.

Preferably, prior to the step of housing the siphon portion 16 inside the casing 5, adhesive is spread over the top part of the siphon portion 16 intended to be joined to the bottom 2a of the pan 2.

Preferably, the pan 2 is prepared for joining to the siphon portion 16 by means of removal of ceramic material from the bottom zone which comprises the bottom 2a and/or a partial rear side surface 2b.

Preferably the step of providing the bottom 2a and the side surface 2b is performed following the step of raising and extraction of the pan 2 with rim 3 from the first mould S1.

Preferably during the step for forming, by means of casting in the first mould S1 consisting of two parts, the pan 2 and the rim 3 as a single body the perimetral surfaces 8, 14 are formed, said surfaces defining the tubular chamber 4 of the rim 3 and the surface 31 joining together pan 2 and rim portion 3 and

extending in a direction transverse to the common plane P of lie with an extension configured to generate continuous outer surfaces which are devoid of cavities or projections extending in planes parallel to the common plane P of lie and are oriented so as to converge towards the main axis Z of extension.

5 With a bowl thus designed the predefined objects are achieved owing to the separation of pan and rim from the siphon portion.

In addition to this the particular constructional form of the pan and the rim should be mentioned.

10 The separation of the siphon portion from the pan allows simplification of the mould for forming the pan with rim and at the same time the possibility of choosing the type of siphon portion which is most suited for the final needs.

This increases the capacity for adapting the bowl product not only in terms of range of aesthetic design, but also as regards the functional requirements of the environment in which it is to be installed.

15 In addition to this, in particular, owing to the geometric continuity of the top edge of the pan and the bottom part of the rim, together with the linearity of the surfaces defining the tubular chamber, it is possible to obtain a form without horizontally extending cavities or recesses so that the two combined components may be obtained in a mould consisting of only two parts and having an extremely
20 simple structure.

All this is achieved while ensuring high standards in terms of quality and appearance of the bowl and, in particular, a guarantee of reliable operation of the bowl as a whole.

Claims

- 1) A ceramic bowl obtained by means of casting in moulds, comprising:
- a liquid collection pan (2);
- a siphon portion (16) for draining liquids from the pan (2);
- a liquid distribution rim (3) having at least one portion configured to reproduce
5 the top edge (7) of the pan (2) along a common plane (P) of lie; said portion
having a toroidal cross-section generating a tubular chamber (4) for the passage of
liquids; said rim (3) and said pan (2) being made as a single body in a mould (S1);
- an outer casing (5) for housing said pan (2) and said rim (3) in the form of a
single body,
10 characterized in that the siphon portion (16) for draining the liquids is separate
from the pan (2), formed as a single body with the casing (5), and configured to be
joined to the pan (2) inside said casing (5).
- 2) The bowl according to claim 1, wherein at least the perimetral surfaces (8,
15 14) which define the tubular chamber (4) of the rim (3) and the surface (31)
joining together pan (2) and rim portion (3) and extend in a direction transverse to
the common plane (P) of lie have an extension configured to generate continuous
outer surfaces which are devoid of cavities or projections extending in planes
parallel to the common plane (P) of lie and are oriented towards the main axis (Z)
20 of extension of the pan (2).
- 3) The bowl according to claims 1 or 2, wherein said perimetral surfaces (8,
14) of the tubular chamber (4) transverse to the common plane (P) of lie have an
extension parallel to each other and define the inner and outer side walls of the
25 tubular chamber (4) with respect to the pan (2).
- 4) The bowl according to any one of the preceding claims, wherein said rim
portion (3) comprises the tubular chamber (4), the bottom surface (6) of which is
joined, at its end, to the top edge (7) of the joining surface (31) of the pan (2) so as
30 to form, with the same joining surface (31), a substantial right angle (α) defining a
projecting outer extended part of the pan (2) itself.
- 5) The bowl according to any one of the preceding claims, wherein the rim
portion (3) comprises a flange (8) inside the pan (2) extending substantially

vertically and defining the inner side surface of the tubular chamber (4); said flange (8) being configured with a bottom free portion thereof partially facing the top edge (7) of the joining surface (31) of the pan (2) so as to define a discharge channel (9) for liquid passing through the tubular chamber (4).

5

6) The bowl according to any one of the preceding claims, wherein the inner flange (8) defining the side surface of the tubular chamber (4) and the surface (31) joining the pan (2) are configured to obtain dimensional variations in their relative distance so as to define narrower zones or wider zones of the liquid discharge channel (9).

10

7) The bowl according to claim 6, wherein the inner flange (8) of the tubular chamber (4) has an intermediate portion (10) thereof which is joined to a section joining together bottom surface (6) and top edge (7) of the pan (2) so as to configure a closed zone along the extension of the tubular chamber (4).

15

8) The bowl according to any one of the preceding claims, wherein the bottom surface (6) of the tubular chamber (4) comprises protrusions (11) projecting towards the inside of the said tubular chamber (4) for distributing the passing liquid.

20

9) The bowl according to any one of the preceding claims, wherein the rim portion (3) comprises a surface (12) defining the top wall of the tubular chamber (4) and provided with a flange (13) projecting from the outer side surface (14) of the tubular chamber (4); the projecting flange (13) defining a surface for resting the rim (3) on the top surface (15) of the casing (5).

25

10) The bowl according to any one of the preceding claims, wherein said rim (3) comprises a second rear portion (17) which is defined by an extended part of the portion generating the tubular chamber (4) and inside which a liquid supply channel (18) for the tubular chamber (4) is formed.

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11) A method for manufacturing a toilet bowl:

- a liquid collection pan (2) having a main axis (Z) of extension;

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- a siphon portion (16) for draining the liquids from the pan (2);

- a liquid distribution rim (3) having at least one portion configured to reproduce the top edge (7) of the pan (2) along a common plane (P) of lie; said portion

having a toroidal cross-section generating a tubular chamber (4) for the passage of liquid having as axis of rotation the said axis (Z) of the pan (2);

- an outer casing (5) for housing and partially covering said pan (2) and said rim (3),

5 characterized in that it comprises the following steps:

- providing a first mould (S1) for forming as a single body pan (2) and rim (3), composed of two parts, i.e. bottom part and top part, which are movable so as to be opened and closed along an axis perpendicular to the common plane (P) of lie and parallel to the main axis (Z) of extension;

10 - forming the pan (2) and the rim (3) by means of casting in the first mould (S1);

- providing a second mould (S2) for forming the casing (5) comprising the siphon portion (16);

- forming the casing (5) and the siphon portion (16) for draining the liquids from the pan (2) by means of casting inside the second mould (S2);

15 - raising the top part of the first mould (S1) in order to extract the pan (2) and rim (3) from the mould;

- opening the second mould (S2) in order to prepare the casing (5) for housing the pan (2) and rim (3);

- inserting and resting the pan (2) and rim (3) inside the casing (5);

20 - joining the liquid drainage siphon portion (16) to the bottom of the pan (2).

12) The method according to any one of the preceding claims, wherein the step of forming pan (2) and rim (3) is performed so that the perimetral surfaces which define the tubular chamber (4) of the rim (3) and the contact surfaces of pan (2) and rim portion (3) have, in cross-section, an extension of the corresponding connecting zones configured to generate a continuous outer surface having connecting angles greater than an acute angle, i.e. devoid of cavities oriented towards the inside of the pan (2) and in planes parallel to the common plane (P) of lie.

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FIG.1

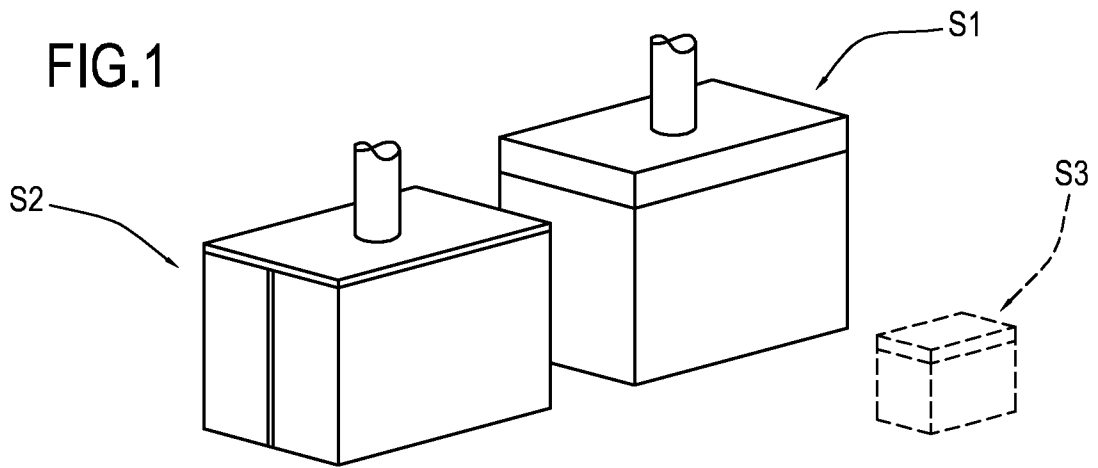


FIG.6

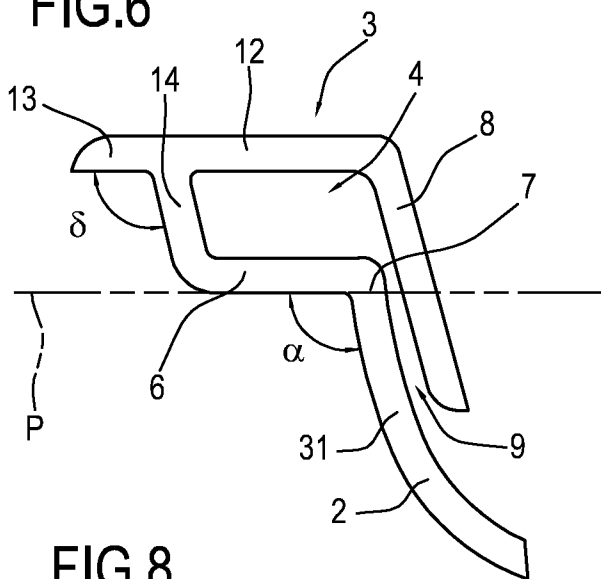


FIG.7

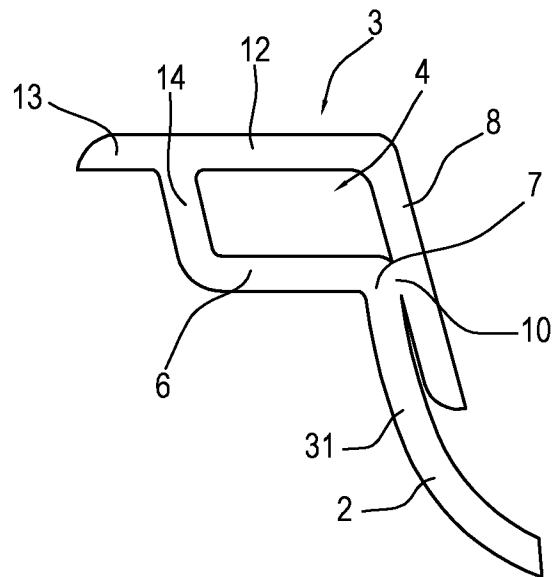


FIG.8

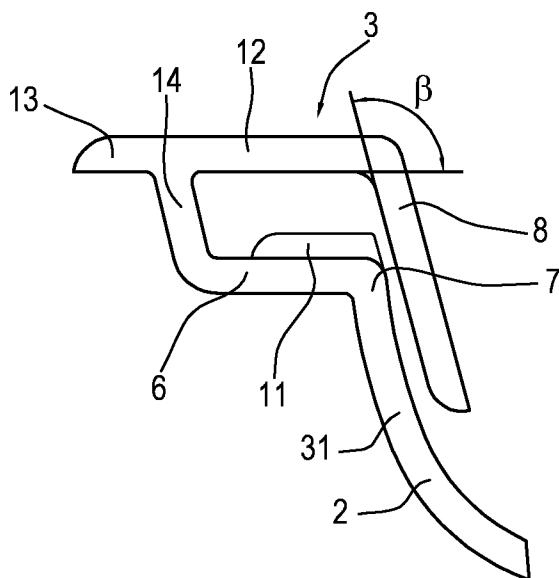


FIG.2

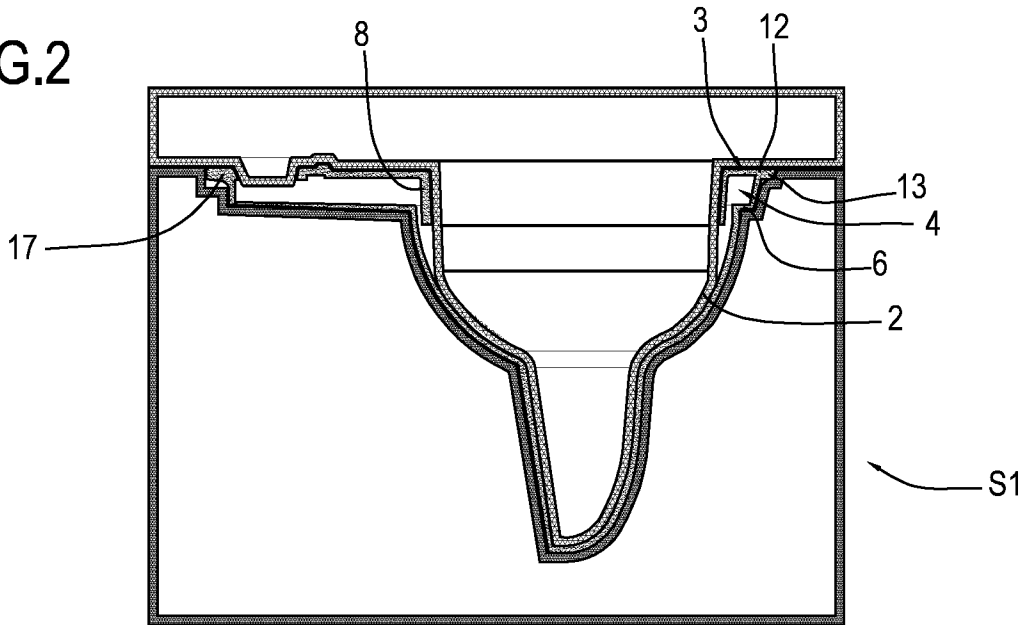


FIG.3

