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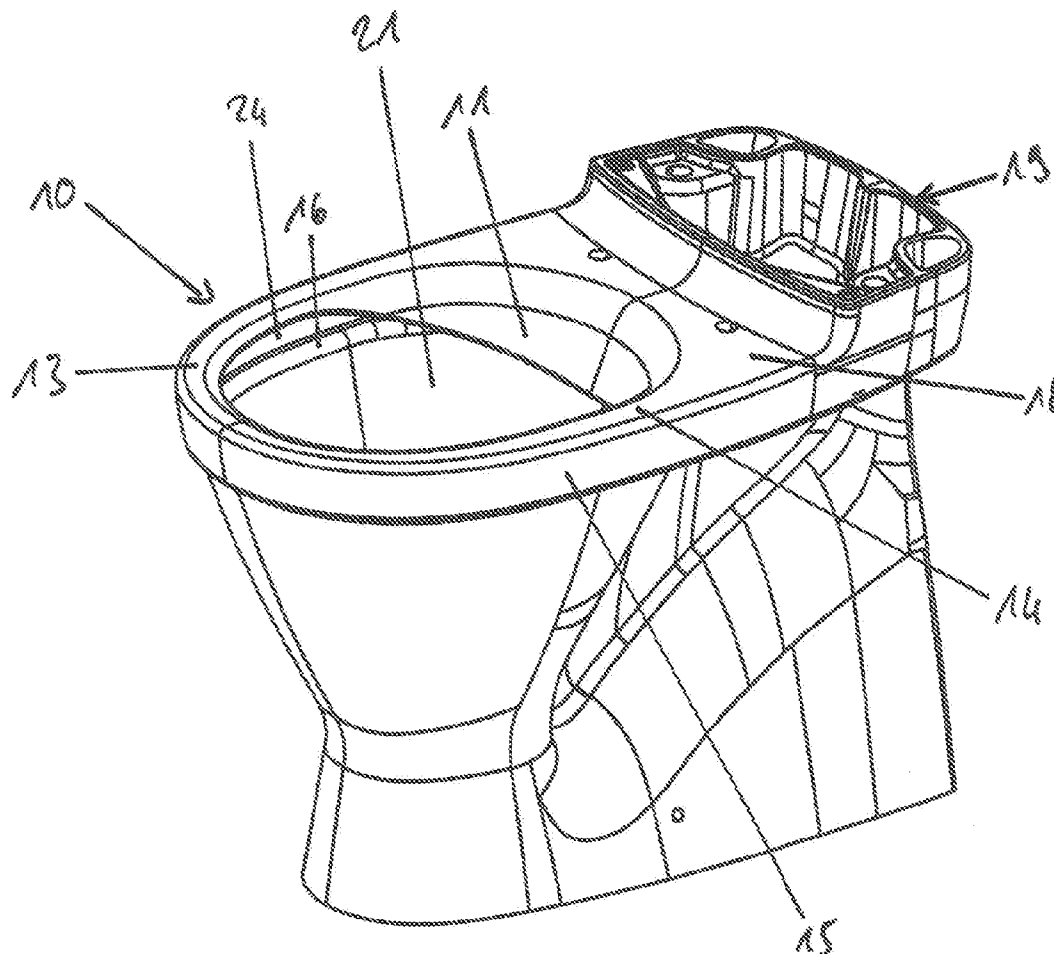
(19) **United States**(12) **Patent Application Publication**
KILPELÄINEN(10) **Pub. No.: US 2015/0176264 A1**(43) **Pub. Date: Jun. 25, 2015**(54) **TOILET PAN AND TOILET**(71) Applicant: **Villeroy & Boch AG**, Mettlach (DE)(72) Inventor: **Kari KILPELÄINEN**, Gustavsberg (SE)(21) Appl. No.: **14/571,915**(22) Filed: **Dec. 16, 2014**(30) **Foreign Application Priority Data**

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E03D 11/02 (2006.01)(52) **U.S. Cl.**CPC **E03D 11/02** (2013.01)(57) **ABSTRACT**

The invention relates to a toilet pan, especially made from ceramic material, having a pan rim (10) and having a distribution apron (11), open to the bottom, which is arranged in front of an inflow opening (12) of the pan rim (10) and which forms a deflection plate, the pan rim (10) having a circumferential, especially completely circumferential, projection (13) which forms an apron-free water guideway which is in fluid connection with the distribution apron (11). It is distinguished by the fact that the projection (13) has a horizontal first wall (14), which makes a transition into the deflection plate of the distribution apron (11), and the pan rim (10) has a second wall (15), which extends downwards, the first and second walls (14, 15) delimiting a hollow channel of the water guideway, which is open to the side and to the bottom.



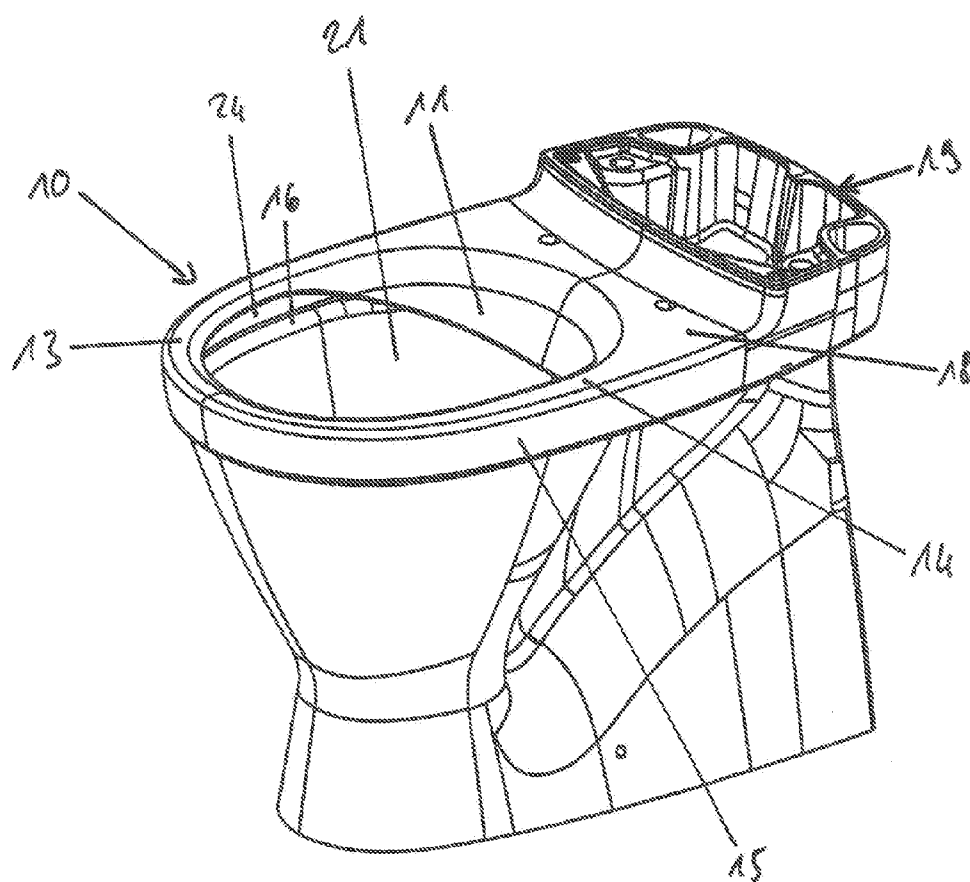


Fig. 1

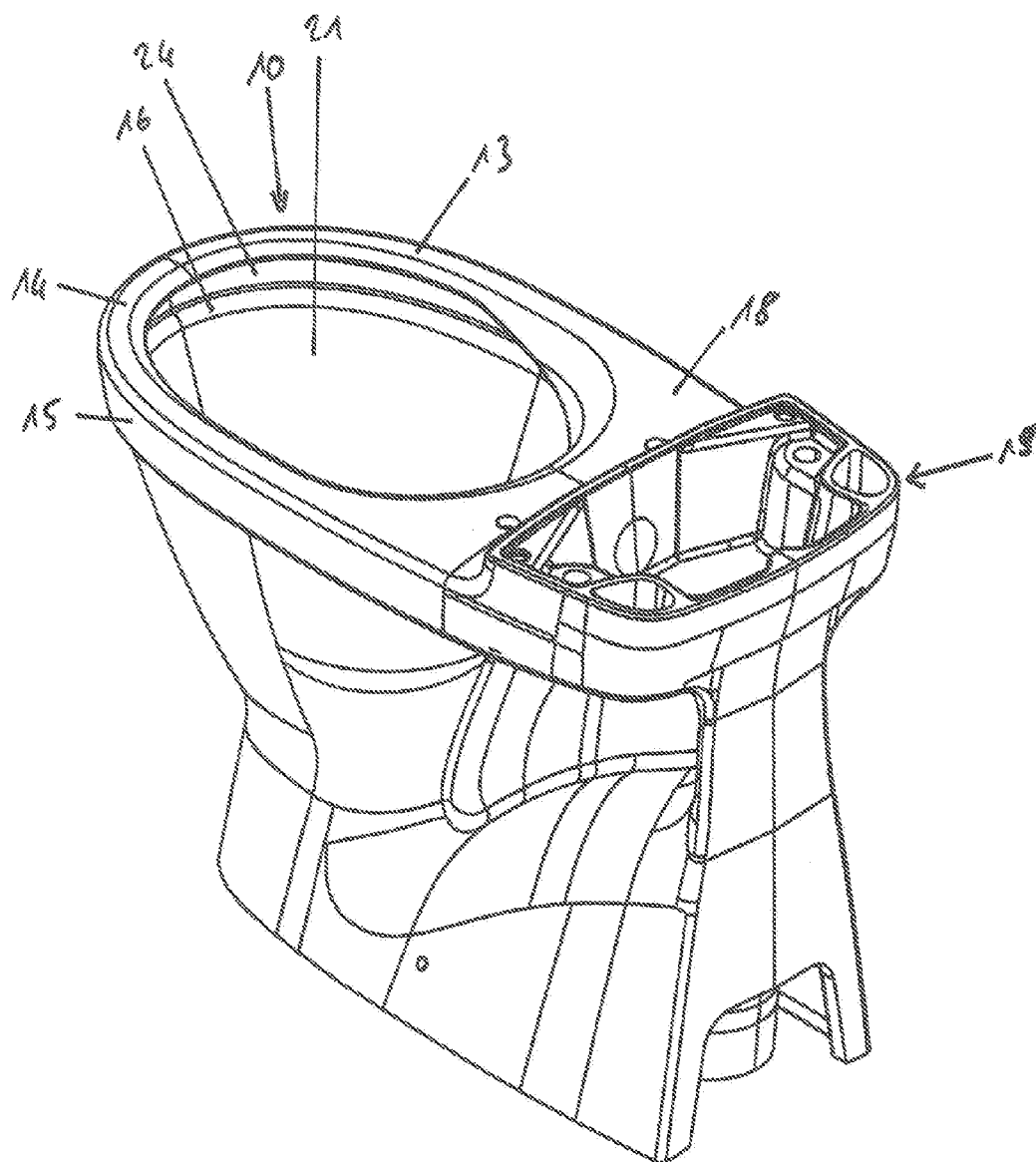


Fig.2

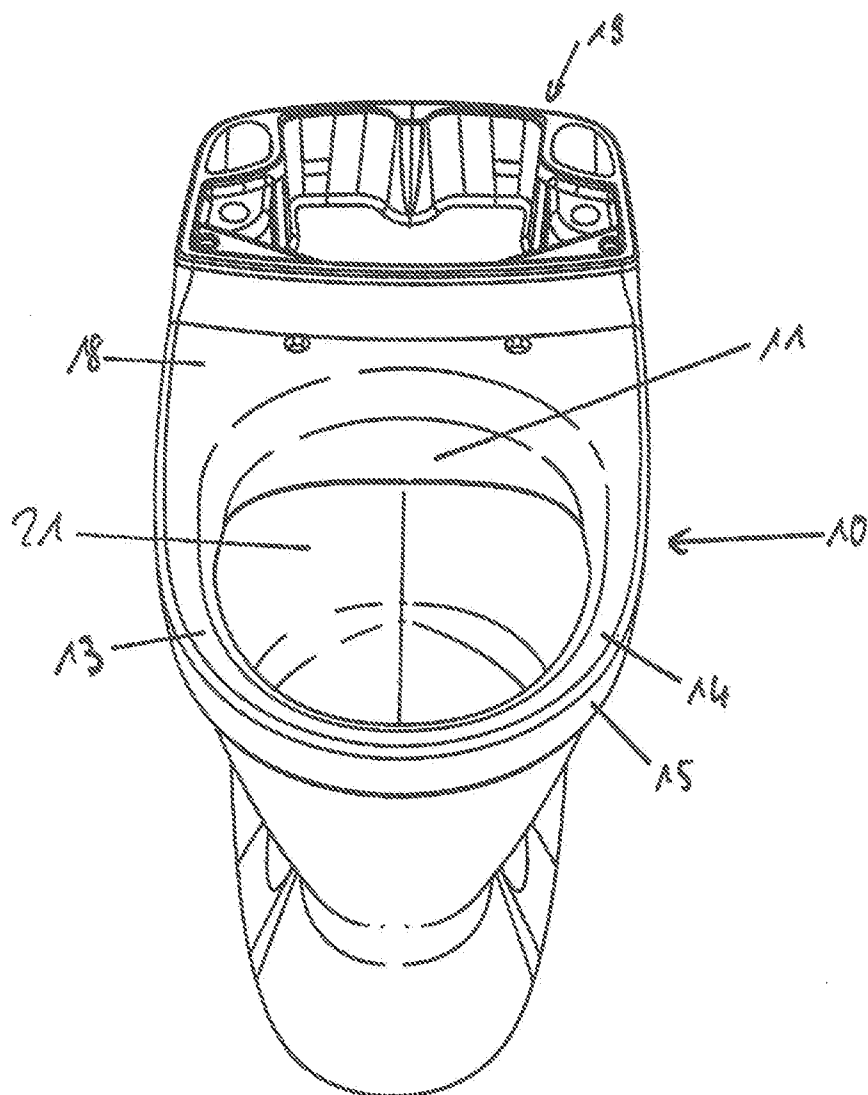


Fig. 2

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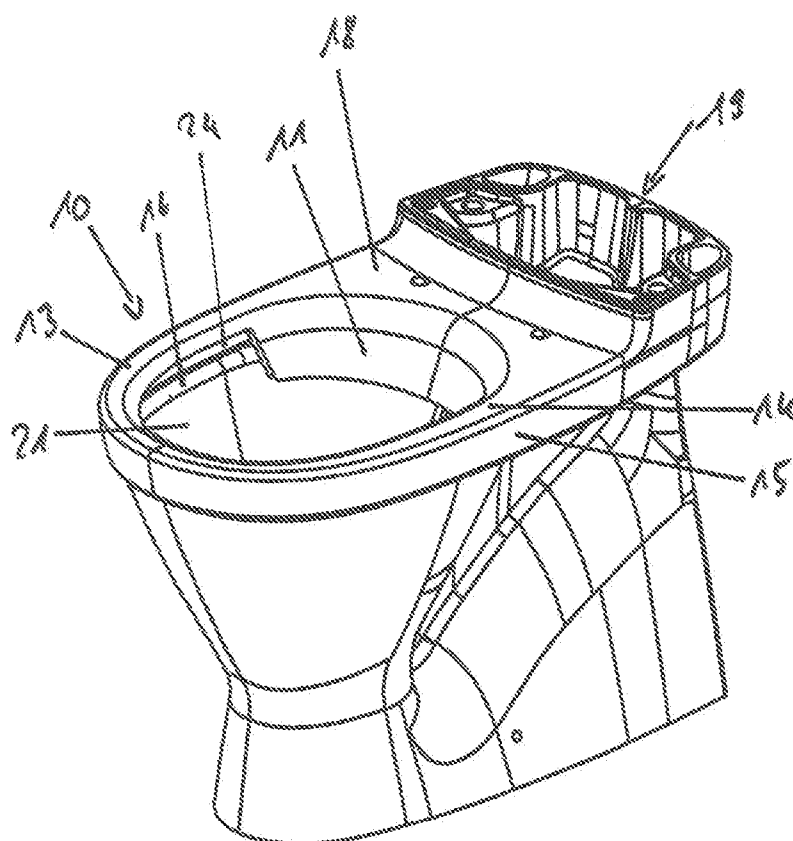


Fig. 3

FOUO

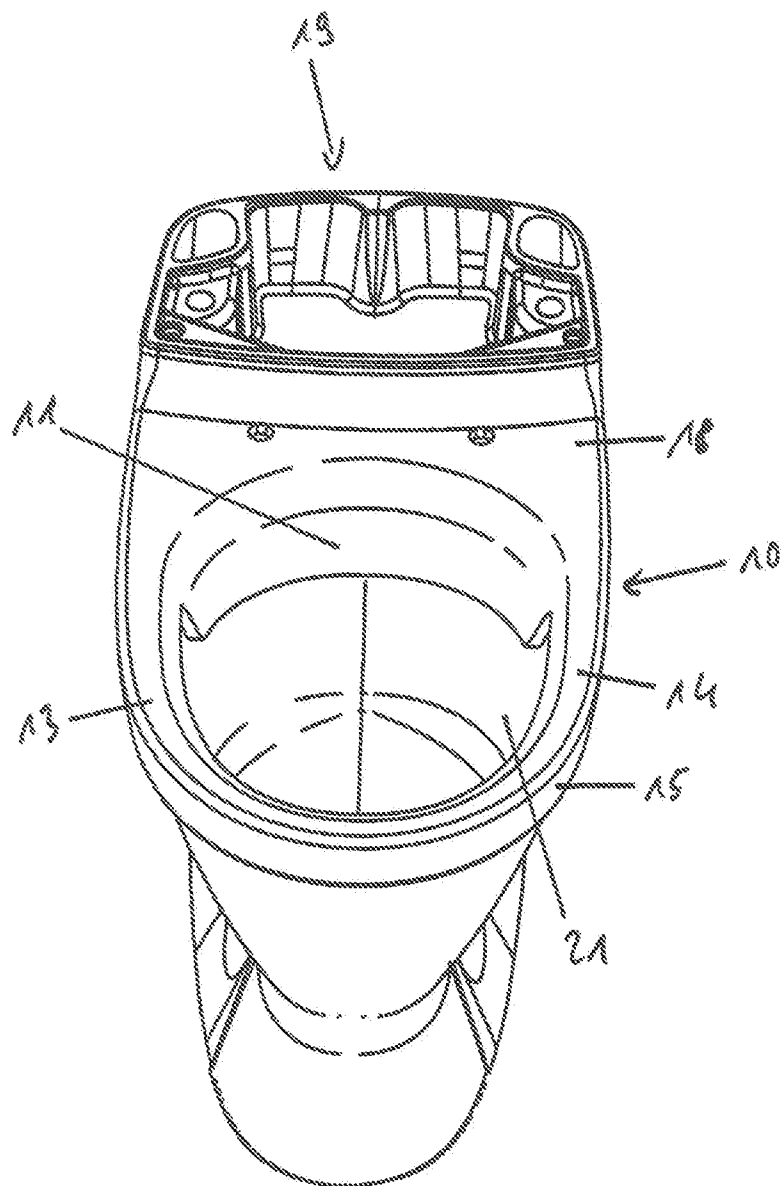


Fig.7

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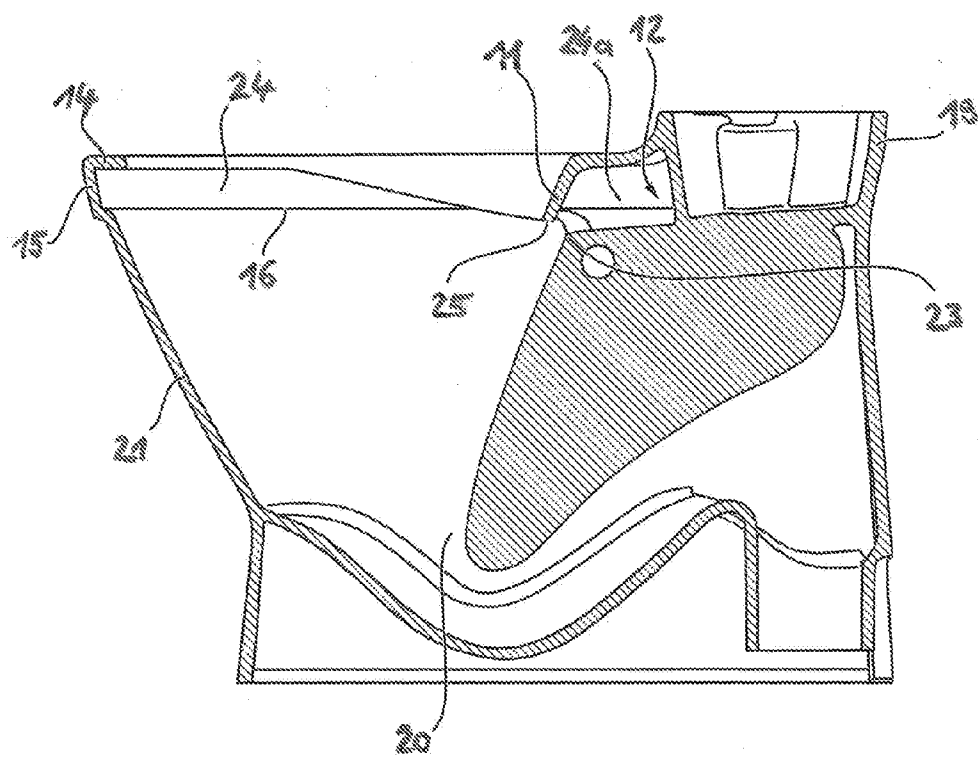


Fig. 9

TOILET PAN AND TOILET

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit and priority of German Application No. DE102013114514.0, filed Dec. 19, 2013 and German Application No. DE2014104500.9, filed Mar. 31, 2014. The entire disclosures of each of the above applications are incorporated herein by reference.

FIELD

[0002] The invention relates to a toilet pan, especially made from ceramic material, having a pan rim and having a distribution apron, open to the bottom, which is arranged in front of an inlet opening and which forms a deflection plate. The pan rim has a circumferential projection which forms an apron-free water guideway. The water guideway is in fluid connection with the distribution apron.

BACKGROUND

[0003] Such a toilet pan is known, for example, from GB 2 431 937.

SUMMARY

[0004] The invention relates furthermore to a toilet having such a toilet pan.

[0005] The flushing operation has two functions in the case of toilet pans. Firstly, the flushing water washes faecal matter off the wall of the pan. Secondly, the water present in the sump of the toilet is transported into the drain. For complete cleaning of the inner surface of the pan, the flushing water is distributed around the circumference of the pan, starting from the inlet, so that the flushing water can flow down the inside wall of the pan and into the sump. For that purpose, the known toilet pan mentioned at the beginning has a distribution apron, which is arranged in front of the inlet opening of the pan rim. The distribution apron forms a deflection plate, which causes the flushing water flowing in from the inlet opening to be distributed in both directions around the circumference of the pan. The intention is that the flushing water should be prevented from splashing out by means of a projection which extends along the rim of the pan and forms an apron-free water guideway. It is not possible for this to be done reliably in the case of the known pan, so that undesirable splashes of flushing water do occur occasionally.

[0006] The invention is based on the problem of so improving the known toilet pan that the security against the splashing-out of flushing water is increased, whilst retaining the good accessibility of the water guideway for cleaning the pan. The invention is furthermore based on the problem of providing a toilet having such a toilet pan.

[0007] In accordance with the invention, the problem is solved by a toilet pan having the features of claim 1 and, having regard to the toilet, by the subject-matter of claim 10.

[0008] The invention is based on the idea of providing a toilet pan, especially made from ceramic material, having a pan rim and having a distribution apron open to the bottom. The distribution apron is arranged in front of an inlet opening of the pan rim and forms a deflection plate. The pan rim has a circumferential, especially completely circumferential, projection which forms an apron-free water guideway. The water guideway is in fluid connection with the distribution apron. The toilet pan according to the invention is distinguished by

the fact that the projection has a horizontal first wall, which makes a transition into the deflection plate of the distribution apron. The pan rim has a second wall, which extends downwards. The first and second walls delimit a hollow channel of the water guideway, which is open to the side and to the bottom.

[0009] The invention has several advantages.

[0010] The security against the splashing-out of flushing water is increased by the invention because the horizontal first wall of the projection makes a transition into the deflection plate of the distribution apron. As a result, a closed fluid connection is formed between the apron-free water guideway and the distribution apron so that the flushing water in the region of the transition between the water guideway and the distribution apron cannot splash out from the toilet pan. In addition thereto, the flushing water in the region of the water guideway, that is to say after the distribution apron in the direction of flow, is reliably retained in the toilet pan, because the first and second walls delimit a hollow channel which, especially as a result of the first horizontal wall, makes possible an improved water guideway, which causes the flushing water guided along the pan rim to be reliably retained in the pan. The hollow channel of the water guideway formed between the first and second wall is open to the side and to the bottom, so that simple cleaning of the water guideway is possible. As a result, the advantages of the apron-free water guideway are retained and, at the same time, the security against the splashing-out of flushing water is increased.

[0011] It has been found, surprisingly, that the construction of the pan rim according to the invention, which is open to the inside, is sufficiently robust in order for the forces introduced by way of the pan rim during use of the toilet pan to be reliably taken up. This is also possible even when the pan rim has a completely circumferential projection formed from a horizontal first wall which makes a transition into the deflection plate of the distribution apron.

[0012] Added to this is the fact that the construction of the toilet pan according to the invention brings with it a significant aesthetic effect. Compared to the known toilet pan mentioned at the beginning, the toilet pan according to the invention provides a light-weight and streamlined overall impression, because the known robust projection has been replaced by the first and second walls. In addition, the transition of the horizontal first wall into the deflection plate of the distribution apron makes for an unusual toilet pan design which catches the eye of the viewer.

[0013] In a further preferred embodiment, the wall extending downwards slants inwards. By that means, on the one hand, an elegant toilet pan shape is achieved, because the second wall delimits the outer circumference of the pan rim and the inwardly slanting arrangement of the second wall defines the outer contour of the toilet pan. On the other hand, the slanting arrangement results in good transfer of forces from the pan rim to the lower region of the toilet pan.

[0014] The water guideway can be improved, for example, by the pan rim having a circumferential step, which delimits the hollow channel in the downward direction. The circumferential step additionally has an aesthetic effect, because the pan rim is offset from the lower region of the toilet pan. The horizontal first wall then projects inwards further than the circumferential step so that the hollow channel is open to the bottom and, on the one hand, the splash protection action in the upward direction and, on the other hand, good water run-down in the downward direction are made possible.

[0015] The first and second walls can have the same wall thickness. This facilitates manufacture of the toilet pan. Here too, an aesthetic effect is additionally brought into play, because the limited wall thickness of the two walls reinforces the streamlined light-weight overall impression of the toilet pan.

[0016] In an especially preferred embodiment, the horizontal first wall makes a continuous transition into the distribution apron. This has the technical advantage that guidance of the water in an inward direction, that is to say along the circumference of the pan in the plane of the deflector wall, is increased so that the security against the splashing-out of flushing water is increased. Added to that is the aesthetic effect, with the continuous transition between the first wall and the distribution apron imparting a harmonious overall impression to the toilet pan.

[0017] There is scope for design freedom for the transition between the first wall and the distribution apron. For example, a transition edge can be formed between the horizontal first wall and the distribution apron, so that the overall effect of the toilet pan is more angular.

[0018] Preferably, the distribution apron extends along a part of the circumference of the pan rim, which constitutes 25% to 35% of the total circumference. This provides adequate security against the splashing-out of flushing water.

[0019] In an especially preferred embodiment of the invention, a bottom edge of the distribution apron is arranged at the same height as or higher than an inner rim of the toilet pan in the region of the inflow opening. The flushing performance of the toilet pan is improved by this arrangement of the bottom edge. It is especially advantageous when the bottom edge of the distribution apron is arranged higher than an inner rim of the toilet pan in the region of the inflow opening. The improvement in flushing performance is shown in the fact that a larger partial flow from the inflow opening flows directly into the toilet pan. As a result, that region of the toilet pan which is located directly beneath the distribution apron is especially well cleaned. The statement "in the region of the inflow opening" means that the distribution apron overlaps the inflow opening at least partially, especially completely. Having regard to the geometry of the toilet pan, the bottom edge of the distribution apron in the region of the central longitudinal axis of the toilet pan is arranged at the same height as or higher than the inner rim of the toilet pan. The central longitudinal axis of the toilet pan is the axis which passes through the middle of the toilet pan in the longitudinal direction. The bottom edge of the distribution apron is arranged symmetrically relative to the central longitudinal axis.

[0020] In other words, the lowermost point of the bottom edge of the distribution apron is arranged at the same height as or higher than the inner rim of the toilet pan.

[0021] The above-described height position of the bottom edge is disclosed and claimed in connection with the horizontal first wall which makes a continuous transition into the distribution apron and also in connection with the transition edge between the horizontal first wall and the distribution apron and also independently of the above-described transition.

DRAWINGS

[0022] The invention will be described in greater detail hereinbelow by way of examples of embodiments with further details and with reference to the accompanying Figures, in which:

[0023] FIG. 1: shows a perspective view of a toilet having a toilet pan according to an example of an embodiment according to the invention;

[0024] FIG. 2: shows the toilet according to FIG. 1 in an oblique view from the rear;

[0025] FIG. 3: shows the toilet according to FIG. 1 from the front;

[0026] FIG. 4: shows a longitudinal section through the toilet according to FIG. 1;

[0027] FIG. 5: shows a perspective view of a variant of the toilet pan according to FIG. 1, having an angular transition;

[0028] FIG. 6: shows an oblique perspective view of the toilet according to FIG. 5 from the rear;

[0029] FIG. 7: shows a perspective view of the toilet according to FIG. 5 from the front;

[0030] FIG. 8: shows a longitudinal section through the toilet according to FIG. 5; and

[0031] FIG. 9: shows a longitudinal section through a variant of the toilet according to FIG. 1.

DETAILED DESCRIPTION

[0032] The toilet according to FIG. 1 is a floor-mounted toilet having a pedestal to be mounted on a floor. The invention can also be applied to other types of toilet, for example a suspended toilet, which does not have a pedestal but which is fixed to a wall in known manner. The same applies to all the examples of embodiments described in this application. The invention relates generally to so-called flush-down toilets, in which the sump of the pan is connected to an air trap to prevent smells from emanating (FIG. 4).

[0033] The detailed features described hereinbelow are put into practice in both examples of embodiments according to FIGS. 1-4 and FIGS. 5-8 and are described and disclosed in connection with both examples of embodiments. The differences between the examples of embodiments lie in the transition between the horizontal wall 14 and the distribution apron 11, which will be explained separately.

[0034] As shown in all the Figures, the toilet pan has a pan rim 10 which delimits an upper opening of the pan. The pan rim 10 makes a transition into a fixing surface 18, which serves for fixing the toilet seat and lid. Appropriate fixing apertures are provided for the purpose. Optionally, a mounting region 19, on which a cistern can be fixed, is provided adjacent to the fixing surface 18. The mounting region 19 has a water connection for the flushing water supply. Wall-hung toilets are appropriately modified.

[0035] As can be seen in FIGS. 4 and 8, the toilet pan has a central inflow opening 12, which is centrally arranged in the region of the pan rim 10. The outflow opening 20 is constructed in a manner known per se in the sump of the toilet and includes an air lock. The flushing region 21 of the pan extends between the outflow opening 20 and the inflow opening 12. The depiction of the flushing region 21 presented in FIGS. 1-8 is to be understood as being by way of example. There is scope to construct this region differently in its design, especially in aesthetic aspects.

[0036] As can be seen well in FIGS. 4 and 8, the pan rim 10 has a distribution apron 11 open to the bottom. Starting from

the upper edge of the pan rim 10, the distribution apron 11 extends in an inward direction into the toilet pan. The distribution apron 11 is arranged in front of the central inflow opening 12 and forms a deflection plate. This has the function of causing the flushing water flowing out from the inflow opening 12 to be deflected to both sides in the circumferential direction of the pan, so that rinsing of, as far as possible, all the flushing region 21 is possible along the pan rim 10. The distribution apron 11 is open to the bottom so that a gap 22 is formed between the deflection plate and an inner rim 23 of the pan. During flushing, some of the flushing water flows through the gap 22 and into the toilet pan so that excreted material located below the distribution apron 11 is washed away.

[0037] The inner rim 23 in the region of the distribution apron forms the terminal edge of a flow space 24a, which forms part of the inflow opening 12. As can be seen in FIGS. 4 and 8, the bottom edge 25 of the distribution apron 11 is constructed so as to be lower than the inner rim 23, so that the distribution apron 11 completely overlaps the inflow opening 12. This means that the flushing water flowing in from the inflow opening 12 is reliably directed downwards in the region of the distribution apron 11.

[0038] It has been found, surprisingly, that an alternative arrangement of the bottom edge of the distribution apron improves flushing performance. In the variant, as shown in the example of an embodiment according to FIG. 9, the bottom edge 25 of the distribution apron is arranged higher up than the inner rim 23. As a result, the gap between the distribution apron 11 and the inner rim 23 is made somewhat larger so that a larger partial flow of flushing water flows directly into the pan beneath the distribution apron 11. If the bottom edge 25 is arranged at the same height as the inner rim 23 or a maximum of 2 cm higher than the inner rim, especially a maximum of 1 cm, especially a maximum of 0.5 cm higher than the inner rim 23, undesirable splashing-out of the flushing water is avoided whilst at the same time improving flushing performance. The position of the inner rim 23 and of the lowest point of the bottom edge 25 is related to the same reference point, for example the floor. In other words, the inner rim 23, for example where it intersects the central longitudinal axis, has a first spacing from the floor. The bottom edge 25, where it likewise intersects the central longitudinal axis, has a second spacing from the floor. The spacing between the bottom edge 25 and the inner rim 23 corresponds to the difference between the first and second spacings.

[0039] The angle of slant of the distribution apron 11 corresponds approximately to the angle of slant of the toilet pan below the distribution apron 11. In other words, the distribution apron and the toilet pan wall below the distribution apron 11 extend substantially parallel, at least in the upper region close to the inner rim 23.

[0040] The position of the bottom edge is disclosed in FIG. 9 in connection with the continuously extending distribution apron 11. The position of the bottom edge disclosed above is also disclosed in connection with the examples of embodiments according to FIGS. 5-8.

[0041] The flushing water deflected in a circumferential direction in the region of the distribution apron 11 flows along the pan rim 10 during flushing, with some of the flushing water flowing down into the pan and rinsing the flushing region 21. For that purpose, the pan rim 10 has a circumferential—in the case of the examples of embodiments according to FIGS. 4 and 5 completely circumferential—projection

13, which forms an apron-free water guideway. The water guideway is apron-free because in this region there are no structures which project downwards.

[0042] As shown in FIGS. 4 and 8, the projection 13 is completely circumferential. This means that the projection 13 and consequently also the water guideway extend along the entire circumference of the pan rim 10. The water guideway is in fluid connection with the distribution apron 11. This means that the flushing water deflected by the distribution apron 11 passes into the water guideway on flushing and, from there, is distributed around the circumference of the pan and flows into the pan.

[0043] At this point it is made clear that the projection 13 on the one hand forms the apron-free water guideway outside the region of the distribution apron 11. The projection 13 on the other hand forms the upper boundary of the toilet pan in the region of the distribution apron. The water guideway and consequently the projection 13 are therefore apron-free in regions, more specifically in the region outside the distribution apron 11, as is shown in all the Figures. The apron-free region of the toilet pan is 65% to 75% of the total circumference.

[0044] As can be seen in the Figures, the projection 13 has a horizontal first wall 14. The horizontal first wall 14 extends radially inwards and terminates the pan rim 10 in the upward direction. This can be seen well in FIGS. 4 and 8. The pan rim 10 has a further, second wall 15, which extends downwards. The direction indicator “downwards” relates to the position of the toilet in use. The first and second walls 14, 15 are connected to one another at an angle and delimit a hollow channel of the water guideway which is open to the side and to the bottom. In other words, the two walls 14, 15 form an L-shaped angular profiled section extending in the circumferential direction of the pan rim 10, with one limb of the angular profiled section being horizontally arranged (horizontal first wall 14). The angular profiled section curves around in the circumferential direction of the pan.

[0045] The horizontal first wall 14 finishes flush with an upper edge of the pan rim 10, as can be seen especially in FIGS. 4 and 8. The horizontal first wall 14 accordingly forms the upper face of the toilet pan. In the region of the inner edge of the first wall 14 there can be provided a rounding-off which gives the pan rim a pleasing appearance. The first wall 14 extends radially inwards so far that reliable protection against flushing water splashing out is achieved. A wall width of from 2 cm to 6 cm is sufficient for the purpose. The second wall 15, which extends downwards, slants slightly inwards. Other orientations of the second wall are possible and can be selected substantially freely by the designer. The pan rim 10 has a circumferential step 16, which delimits the hollow channel 24 in the downward direction. The step 16 extends parallel to the first wall 14 and causes the pan rim 10 in the region of the water guideway to project outwards. On the one hand, as a result thereof, good water guidance is achieved. On the other hand, as a result of the outwardly projecting pan rim 10, the aesthetic overall impression of the toilet pan is influenced. Here too, other arrangements are possible depending on aesthetic or technical considerations.

[0046] In the case of the present examples of embodiments, the first and second walls 14, 15 have the same wall thickness. Overall, the wall thickness of the two walls 14, 15 corresponds to the wall thickness of the pan in the flushing region 21.

[0047] In contrast to the example of an embodiment according to FIGS. 5-8, the example of an embodiment according to FIGS. 1-4 has a continuous transition between the horizontal first wall 14 and the distribution apron 11. This can be seen well in FIGS. 1-4. For the continuous transition, the first wall 14 becomes wider, with the widened wall portion departing from the horizontal plane and curving down. In so doing, the first wall makes a continuous transition into the deflection plate of the distribution apron 11. This also applies to the inner edge of the second wall 15, which continuously extends in the downward direction and makes a transition into the distribution apron 11. As a result, on the one hand, an extension of the distribution apron 11 in the circumferential direction is achieved so that the guiding effect and, as a result, the reliability of preventing the splashing-out of flushing water out are improved. On the other hand, the sweeping curve shape gives rise to an especially aesthetic shape.

[0048] As shown in FIG. 3, the distribution apron 11 and the continuous transition are symmetrically constructed so that the improvement referred to is applied in both circumferential directions. The slant angle of the continuously downwardly extending inner edge of the first wall can be varied.

[0049] In the case of the example of an embodiment according to FIGS. 5-8, there is provided, instead of the continuous transition, a transition edge 17 which is formed between the horizontal first wall 14 and the distribution apron 11. This produces an abrupt transition between the distribution apron 11 and the first wall 14, as a result of which a different overall impression of the toilet is achieved than in the case of the example of an embodiment according to FIGS. 1-4.

[0050] From a technical point of view, the angular transition has the advantage that the overlapping of the inner rim 23 by the distribution apron 11 is possible along a longer sub-region of the circumference than in the case of the example of an embodiment according to FIGS. 1-4.

[0051] In the case of both examples of embodiments it is the case that the distribution apron extends along a part of the circumference of the pan rim 10, which constitutes 25% to 35% of the total circumference.

LIST OF REFERENCE NUMERALS

[0052] 10 pan rim
 [0053] 11 distribution apron
 [0054] 12 inlet opening
 [0055] 13 projection
 [0056] 14 first wall
 [0057] 15 second wall

[0058] 16 step
 [0059] 17 transition edge
 [0060] 18 fixing surface
 [0061] 19 mounting region
 [0062] 20 outflow opening
 [0063] 21 flushing region
 [0064] 22 gap
 [0065] 23 inner rim
 [0066] 24 hollow channel
 [0067] 24a flow space
 [0068] 25 bottom edge

1. A toilet pan, especially made from ceramic material, having a pan rim and having a distribution apron, open to the bottom, which is arranged in front of an inflow opening and which forms a deflection plate, the pan rim having a circumferential, especially completely circumferential, projection which forms an apron-free water guideway which is in fluid connection with the distribution apron, comprising:

the projection has a horizontal first wall, which makes a transition into the deflection plate of the distribution apron, and the pan rim has a second wall, which extends downwards, the first and second walls delimiting a hollow channel of the water guideway, which is open to the side and to the bottom.

2. The toilet pan according to claim 1, wherein:

the horizontal first wall finishes flush with the pan rim.

3. The toilet according to claim 1, wherein:

the second wall, which extends downwards, slants inwards.

4. The toilet pan according to claim 2, wherein:

the pan rim has a circumferential step, which delimits the hollow channel in the downward direction.

5. The toilet pan according to claim 1, wherein:

the first and second walls have the same wall thickness.

6. The toilet pan according to claim 5, wherein:

the horizontal first wall makes a continuous transition into the distribution apron.

7. The toilet pan according to claim 6, wherein:

a transition edge is formed between the horizontal first wall and the distribution apron.

8. The toilet pan according to claim 7, wherein:

the distribution apron extends along a part of the circumference of the pan rim, which constitutes 25% to 35% of the total circumference.

9. The toilet pan according to claim 8, wherein:

a bottom edge of the distribution apron is arranged at the same height as or higher than an inner rim of the toilet pan in the region of the inflow opening.

10. A toilet having a toilet pan according to claim 1.

* * * * *