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(54) **A sanitary equipment, and a shrouded fixation for such sanitary equipment**

(57) A ceramic sanitary equipment to be attached to a wall (20) by means of at least one bolt is provided. The sanitary equipment comprises a main body (11) and a rear end (14) integrally formed with said main body (11) and facing said wall (20) when attached, wherein said rear end (14) comprises at least one area (17, 18) onto which a shrouded fixation device (300) is securely attached by means of an adhesive material, said shrouded fixation device (300) being provided for engagement with an associated fixation support (350) of said wall (20).

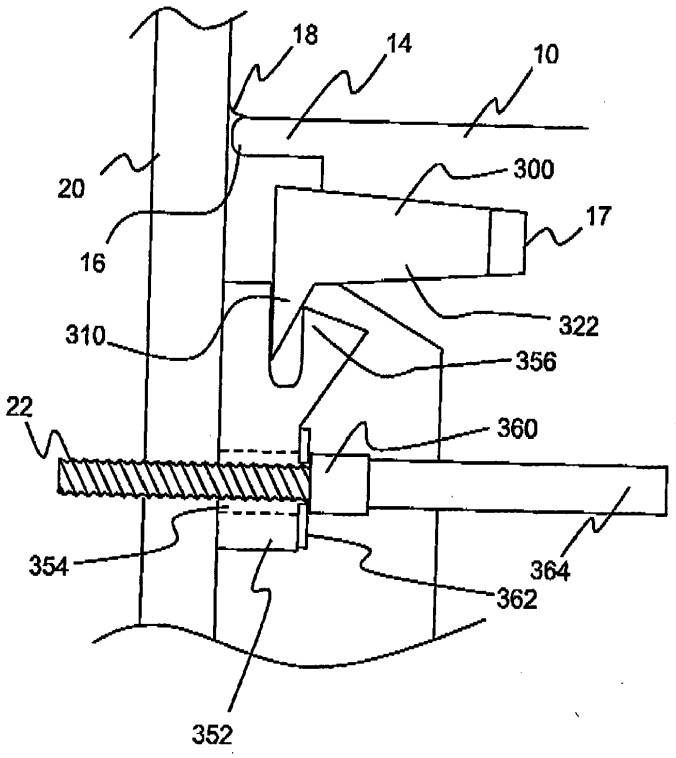

Fig. 6

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Description

Technical Field

[0001] The present invention relates to a sanitary equipment. More particularly, the present invention relates to a wall hung ceramic sanitary equipment, such as a WC bowl or a wash basin, and a shrouded fixation for such. Moreover, the present invention also relates to a method for providing a ceramic sanitary equipment.

Background

[0002] Sanitary equipment, such as WC bowls, bidets, or wash basins, may be mounted in a sanitary facility in many different ways. For example, WC bowls may be secured to the floor supporting the bowl in order to prevent movement of the WC bowl. Such fixation is generally necessary for preventing the water connections, e.g. the water supply and the sewage, to be sealed properly to the bowl.

[0003] However there is a trend to instead mount sanitary equipment to a wall. Such replacement allows a more appealing appearance of the sanitary equipment and it also allows a more flexible positioning of the sanitary equipment within the bathroom facility. Moreover wall mounted sanitary equipment provides facilitated and more efficient cleaning since the area between the sanitary equipment and the floor is made available without any obstructing elements.

[0004] Traditionally wall mounted sanitary equipment are fastened to the wall by means of bolts extending out from the wall, whereby the sanitary equipment is hung onto the bolts and screwed tightly in order to provide a secure fixation.

[0005] Such mounting is cumbersome due to the narrow space on the backside of the sanitary equipment. Further, the bolts onto which the sanitary equipment is hung must be accessible which greatly affects the visual appearance of the equipment.

[0006] One option is therefore to access the bolts through the seat lid holes, which then must be horizontally aligned with the position of the bolts. Should this not be the case, access must be provided from the underside of the WC bowl. This operation makes great demands on the dexterity of the installation personnel, and it also requires the provision of a supportive structure in the rear end for the fixation device to press against.

[0007] More particularly, the manufacturing process of the sanitary equipment is highly dependent on the kind of intended fixation. If a readily accessible, and thus visible, fixation is to be used, various manufacturing techniques may be utilized. However, in case of a shrouded or concealed fixation, a very complex molding process must be utilized for handling negative draft angles which are necessary for forming a support surface for the fixation device when the fixation acts to press the rear end towards the wall. Complex molding requires more advanced molds and techniques thus increasing the overall manufacturing cost substantially.

[0008] Hence, there is a need for a ceramic sanitary equipment as well as to an associated fixation arrangement allowing an improved method for mounting a sanitary equipment to a wall structure.

Summary

[0009] The present invention seeks to mitigate or eliminate the above-identified deficiencies and solves at least the above mentioned problems by providing a fixation for a wall hung sanitary equipment.

[0010] An idea of the present invention is to provide a ceramic sanitary equipment which can be molded without any negative draft angles. Hence, a much more simple manufacturing technique, such as high pressure molding or casting, can be utilized thus reducing the manufacturing costs significantly. Such manufacturing technique, i.e. molding with only positive draft angles, has not yet been available for shrouded fixations.

[0011] An object is therefore to provide a ceramic sanitary equipment, such as a WC bowl, a bidet, or a wash basin, which may be wall hung using shrouded or concealed fixations while being manufactured by a simple and low-cost process.

[0012] Another object is to provide a fixation system for such sanitary equipment.

[0013] idea yet further idea is to provide a sanitary equipment with a rear end having at least one area, which area is configured to accommodate, in a static manner by means of an adhesive material, a fixation device for engagement with associated fixation supports on the wall.

[0014] According to a first aspect, a ceramic sanitary equipment to be attached to a wall by means of at least one bolt is provided. The sanitary equipment comprises a main body and a rear end integrally formed with said main body and facing said wall when attached, wherein said rear end comprises at least one area onto which a shrouded fixation device is securely attached by means of an adhesive material, said shrouded fixation device being provided for engagement with an associated fixation support of said wall.

[0015] The rear end may be formed by a molding process involving only positive draft angles, which is advantageous in that a more simple and automatic manufacturing process, such as high pressure casting, may be utilized thus reducing the manufacturing costs significantly.

[0016] The at least one fixation device may be secured to said respective area by means of glue. Hence, a very robust and static attachment of the fixation device may be utilized whereby the fixation device may be premounted to the sanitary equipment for simplifying logistics, transportation, storage, etc.

[0017] The at least one area may surround the respective fixation device along at least a part of the length of

said fixation device. This is advantageous in that improved securing is obtained. Preferably, each area includes one or several ceramic surfaces with good adherence to the adhesive used.

[0018] Said area may be formed as a recess such that the fixation device may be easily aligned and inserted into the area.

[0019] The shrouded fixation device may be configured to be clamped within said associated fixation support of said wall. This is advantageous in that no tools are necessary for providing the required fixation.

[0020] The fixation device may include a first portion which is inserted into said recess, and a second portion which extends out from said recess such that it faces the wall when attached, wherein said second portion comprises a tapered lug. Such fixation device may preferably be used together with a fixation support, comprising at least one receiving member being configured to be securely attached to bolts extending out from said wall, wherein said receiving member forms a U-shape for receiving the tapered lug of said fixation device. The tapered lug - U-shape interface thus provides a very efficient clamping effect, while at the same time urges the sanitary equipment towards the wall.

[0021] The fixation support may preferably extend laterally such that it may engage with two laterally spaced fixation devices. Hence, only one fixation support is required even if several fixation devices are utilized, thus improving and facilitating the mounting process.

[0022] The fixation support may further include a plurality of laterally spaced apart through holes, whereby a single fixation support may be provided to fit with various standards requiring specific distances between the wall bolts.

[0023] The fixation support may further comprise a securing device for locking said fixation support to said sanitary equipment. Preferably, special tools are required to operate the securing device in order to prevent vandalism and unauthorized dismounting of the sanitary equipment.

[0024] The securing device may include at least one hollow sleeve for surrounding the bolt, and a tightening screw for tilting said sleeve relative said bolt. Hence, additional fastening is obtained whereby withdrawing of the sleeves are impossible without loosening the tightening screw.

[0025] The tightening screw may be accessible only via holes in the sanitary equipment. This is advantageous in that already available holes in the outer surface of the sanitary equipment are utilized, whereby no further holes are necessary for tightening.

[0026] The securing device may further include a bridge connecting two laterally spaced apart sleeves. This facilitates handling during mounting, since the bridge will keep the sleeves in place in a very efficient manner.

[0027] According to a second aspect, a method for providing a ceramic sanitary equipment to be attached to a wall is provided. The method comprises the steps of providing a main body, providing a rear end integrally formed with said main body and facing said wall when attached, wherein said rear end is molded such that it comprises at least one area, and securely attaching a fixation device onto said area by means of an adhesive material. The steps of providing the main body and the rear end may preferably be performed by high pressure casting.

[0028] A shrouded fixation device should in this context be interpreted broadly as a fixation device used for securing the sanitary equipment to a wall structure in order to allow the sanitary equipment to be wall hung. Further, the term "shrouded" should in this context be interpreted as being invisible and not accessible for a user during normal operation. Hence, a shrouded fixation device is provided inside the rear end of the sanitary equipment when wall hung, such that the sanitary equipment may have a continuous surface around its periphery. However, a shrouded fixation device does not exclude fixation devices which are accessible through holes in the upper surface of a WC bowl and normally provided to allow the attachment of a seat lid.

Brief Description of Drawings

[0029] These and other aspects, features and advantages of which the invention is capable of will be apparent and elucidated from the following description of embodiments of the present invention, reference being made to the accompanying drawings, in which

Fig. 1 is a cross-sectional view of a sanitary equipment attached to a wall;
Fig. 2a is a partial isometric view of a rear end of a sanitary equipment;
Fig. 2b-2d are cross sectional views of parts of a rear end of sanitary equipments according to specific embodiments;
Fig. 3 is an isometric view of a fixation device according to an embodiment;
Fig. 4 is an exploded view of a fixation support according to an embodiment;
Fig. 5 is an isometric view of the fixation support when mounted;
Fig. 6 is a side view of a sanitary equipment attached to a wall by means of fixation according to a further embodiment; and
Fig. 7 is a side view of a sanitary equipment attached to a wall by means of fixation according to a yet further embodiment.

Detailed Description

[0030] The following description focuses on embodiments of fixations for securely attaching ceramic sanitary equipment, such as WC's, bidets, or wash basins, to a wall.

[0031] Starting with Fig. 1, a ceramic WC bowl 10 is

attached to a wall 20 by means of a shrouded fixation arrangement 30. The WC bowl 10 has a water inlet (not shown) and a water sewage 12 being connected to a sewage pipe extending out from the wall 20. Further, in order to provide the shrouded fixation the WC bowl has a rear end 14 forming a planar periphery 16 abutting the wall 20.

[0032] The sanitary equipment 10, which in this particular embodiment is represented as a WC bowl but may also represent a bidet, a wash basin, or similar, has a main body 11 and a rear end 14. The main body 11 is configured to accommodate water during use, while the rear end 14 is provided for necessary fixations and connections. The rear end 14 is formed integrally with the main body 11.

[0033] For ceramic sanitary equipment, the main body 11 as well as the rear end 14 is normally manufactured by a molding or casting process and subsequent firing, glazing, etc.

[0034] The fixation arrangement 30 is formed by a kit-of- parts, or system, comprising two members 300, 350. The first member 300 is a fixation device which is securely attached to the WC bowl 10 prior to mounting. The fixation device 300 extends from the WC bowl 10 towards the wall 20 but ends at a horizontal distance from the periphery 16 of the rear end 14. Further, the fixation device 300 has a wedge shaped portion 310 in the form of a tapered lug which is projecting vertically downwards from the fixation device 300.

[0035] The second member 350 forms a receiving member or fixation support which is securely attached to the wall 20 prior to mounting. The fixation support 350 extends out from the wall 20 into the rear end 14 of the WC bowl 10. Further, the fixation support 350 has support edges 356 formed by a U-shape which is projecting vertically upwards from the fixation support 350.

[0036] Before turning to details of the fixation 30, a more detailed description of the sanitary equipment 10 will be provided in the following.

[0037] As the sanitary equipment, e.g. the WC bowl 10 shown in Fig. 1 is to be mounted on a wall, it is necessary to provide a rear end 14 with suitable means for allowing such fixations. The present embodiments relate to a ceramic sanitary equipment having at least one, and preferably two fixation devices 300 premounted in a static manner. Preferably, the fixation devices 300 are connected to the rear end 14 such that they do not need to be accessible by a user during mounting.

[0038] A rear end 14 is shown in Fig. 2a. The rear end 14 is formed by molding a composition of clay and water, which is known in the art, into a three-dimensional piece followed by suitable firing and glazing processes. As can be seen in Fig. 2, the rear end 14 is integrally formed with a main body 11 forming the actual bowl. The rear end 14 includes a water sewage connection 12 as well as flushing water inlet 13. Further, the rear end 14 is provided with two laterally spaced areas in the form of recesses or pockets 17, 18. Each recess 17, 18 is formed as a closed-end cavity, of which an open end is provided facing the wall 20 when mounted. Each recess 17, 18 accommodate a fixation device 300 inserted into the open end, such that the tapered lug 310 of the fixation device 300 extends out from said recess 17, 18.

[0039] Since the recesses 17, 18 are terminated by a closed end any fixation device inserted into said recesses 17, 18 will not rest against a support surface in the rear end for allowing the fixation to press the sanitary equipment towards the wall. Moreover, the provision of the closed end recesses 17, 18 makes it possible to mold the rear end 14 without any negative draft angles, which is a major advantage compared to ceramic sanitary equipment available today and intended for being wall hung by means of shrouded fixations. Hence, the unique construction of the rear end, with the closed end recesses 17, 18, and the shrouded fixation which will be described later, allows a much more simplified way of providing wall hung sanitary equipment to a much lesser cost than what is possible today.

[0040] With reference to Figs. 2b-d, other embodiments of rear ends 14 of a sanitary equipment are shown. In Fig. 2b, a rear end 14 is shown having an area 17 formed as a recess into which a shrouded fixation device 300 is inserted and securely attached. As is clearly shown, the rear end 14 is formed without negative draft angles and may thus be manufactured by a simple and automatic process.

[0041] This is also the case for the example shown in Fig. 2c, wherein the rear end 14 does not include a recess. Instead, the area 17 is formed by an angle between two ceramic surfaces onto which the fixation device 300 is attached by means of an adhesive.

[0042] A further embodiment of a rear end 14 is shown in Fig. 2d. Here, the area 17 is formed by a single surface. The dashed lines represent the seat lid holes of a WC bowl, through which tools for operating a fixation device (not shown) may be inserted. Hence, this particular embodiment allows for other fixation devices requiring access for tightening.

[0043] Having a rear end 14 being molded without negative draft angles requires a new way of attaching the fixation devices. Traditionally, accessible pockets for shrouded fixations have allowed fixation devices to be clamped within the rear end. Since this option is no longer available as there will be no support surfaces for ensuring sufficient attachment of the fixation devices, the embodiments presented herein includes the feature of attaching the fixation device by means of adhesives, such as glue.

[0044] Now turning to Fig. 3, an embodiment of a fixation device 300 is shown. The fixation device 300 is secured within a recess 17, 18 of the rear end 14, or attached to an area of the rear end 14 by means of an adhesive material. Preferably, glue is used to securely accommodate the fixation device 300. However, any other adhesive may be used being capable of withstanding a high load. The tapered lug, i.e. the wedge shaped portion 310 extends from a body 320 having the shape of a

truncated pyramid. This particular shape is advantageous in that the body 320 forms a tilted surface 322 which may be inserted into a tapered recess 17, 18 in the WC bowl 10 whereby the required vertical alignment of the wedge shaped portion 310 is easily obtained. However, other shapes such as cylindrical or conical may also be possible for this component. Further, the wedge shaped member 310 forms a tilted surface 312 extending inwards from the apex of the wedge shaped member 300 towards the body 320. The fixation device is preferably made of aluminum, although other strong materials may also be used for this particular component. The surface 322 may further be provided with grooves, or any other topographic structure for increasing the surface to which glue or any other adhesive is applied.

[0045] The features of the fixation device 300 allow the fixation device 300 to be connected to the fixation support 350 of which one embodiment is shown in further details in Fig. 4. The fixation device 350 includes a receiving member 352 which includes through holes 354 for securing said receiving member to bolts extending out from the wall. Preferably, the receiving member 352 extends over two or more fixation devices 300 and is securely attached to two laterally spaced apart bolts. Moreover, additional through holes 354 may be provided such that a single receiving member 352 may be used for different distances between bolts. Further, each through hole 354 may be elongated in a vertical direction for allowing vertical alignment of the receiving member 352.

[0046] The receiving member 352 is formed by a rigid material, such as aluminum or other strong materials, and includes a laterally extended U-shape 356 for receiving the tapered lug 310 of the fixation device 300. Hence, the tapered lug 310 of the fixation device 300 will be clamped into the U-shape 356 when a downward pressure is applied to the sanitary equipment 10.

[0047] The receiving member 352 is secured to the bolts by means of nuts 360 which are threaded onto the bolts. Preferably, a grooved washer 362 is provided on each bolt for improving the robustness of the attachment. Corresponding grooves may thus also be provided on the receiving member 352.

[0048] The fixation support 350 may preferably further include sleeves 364 for each bolt. The inner diameter of each sleeve 364 is preferably somewhat bigger than the diameter of the bolts, such that the sleeves 364 may be tilted relative the bolts when the sleeves 364 are enclosing the bolts. The sanitary equipment 10 may be further secured to the wall by means of a bridge 366 which extends laterally and includes recesses 367 for alignment and engagement with the sleeves 364. The bridge 366 further includes a threaded passageway for receiving a tightening screw 368. The threaded passageway is arranged laterally adjacent to the recesses of the bridge 366 such that insertion of the tightening screw 368 will force the sleeves 364 to tilt relative the longitudinal extension of the bolts. The sleeves 364, the bridge 366, as well as the tightening screws 368 together form a securing device 369 which purpose is to further improve the robustness of the fixation as well as to prevent any lateral displacement of the sanitary equipment 10 relative the wall. The securing device 369 is also advantageous in that it makes the fixation more vandal proof due to the requirement of special tools for dismounting the sanitary equipment from the wall.

[0049] The tightening screws 368 are preferably accessible via holes in the sanitary equipment, which holes may also be used to connect a seat lid in case of a WC bowl.

[0050] The fixation support 350 is further shown in Fig. 5, wherein the receiving member 352 as well as the securing device 369 is shown when they interact with each other. Further, in Fig. 5 it is shown how the seat lid fixation may be provided at the same location as utilized for tightening the securing device 369.

[0051] An embodiment of a wall mounted WC bowl is shown in Fig. 6. The fixation device 300 is inserted into a recess 17 of the WC bowl 10 and fastened by means of glue or another adhesive suitable for attaching the fixation device 300 to a ceramic material of which the sanitary equipment is made of. Improved fastening and alignment is achieved by means of the tilted surface 322 of the fixation device 300 and the corresponding tapered profile of the recess 17.

[0052] The receiving member 352 is securely attached to the wall 20 by means of a bolt 22 extending out from the wall 20. The bolt extends through the receiving member 352 via a through hole 354. The through hole 354 has preferably a non-circular cross section, such that the position of the receiving member 352 may be adjusted vertically and/or horizontally. Further, a washer 362 is provided having a through hole which diameter is only slightly larger than the diameter of the bolt 22. The attachment of the receiving member 352 is provided by means of a nut 360 engaging with the bolt 22.

[0053] Once mounted, the wedge shaped member, or tapered lug 310 of the fixation device 300 is inserted into the distance formed between the legs of the U-shape 356 of the receiving member 352. Hence, the wedge shaped member 310 is abutting the U-shape 356 such that a downward movement of the WC bowl 10 relative the wall 20 urges the WC bowl 10 towards the wall 20 until the wedge shaped portion 310 is clamped against the U-shape 356. At this position, the rear end 14 of the WC bowl 10 is abutting the wall 20, or is arranged close to the wall 20. An additional sealing 18, such as a strip of silicone, may be provided at the interface between the WC bowl 10 and the wall 20.

[0054] The method of mounting sanitary equipment to a wall will now be described. Firstly, the receiving member 352 is attached to the wall 20. Preferably, the nuts 360 are tightened lightly such that the receiving member 352 may be vertically aligned before final tightening of the nuts 360. In a next step, the sanitary equipment 10 is provided with corresponding fixation devices 300. However, this step may be already performed during

manufacturing. At this point it may be suitable to connect all water piping and optional sealing between the wall 20 and the sanitary equipment. The sanitary equipment 10 is subsequently brought into contact with wall 20 such that the periphery 16 of the rear end 14 is close to the wall 20. The position of the sanitary equipment 10 should thus be chosen such that all preinstalled members of the wall 20, such as the receiving member 352 and additional water connectors and sealing parts, are enclosed within the periphery 16 of the toilet. Further, each one of the fixation devices 300 should be arranged vertically above the corresponding receiving member 352 of the wall 20.

[0055] The securing device 369, i.e. the sleeves 364 as well as the bridge 366, could at this point also be provided onto the receiving member in order to form a more robust fixation support 350.However, the securing device 369 is not necessary for providing sufficient fastening of the sanitary equipment. It merely serves to improve the stability and robustness for making the final fixation vandal proof.

[0056] In a last step, the WC bowl 10 is lowered such that the wedge shaped portion 310 abuts the U-shape 356. As the WC bowl 10 is moved further downwards the wedge shaped member 310, and thus the entire WC bowl 10, is urged towards the wall 20 until the wedge shaped member 310 is clamped into the U-shape 356 of the receiving member 352. The rear end 14 of the WC bowl 10 will at this position be close to the wall 20. Consequently, the WC bowl 10 is tightly secured with respect to the wall 20. It should be noted that the described fixation is very robust and does not allow any movement of the sanitary equipment relative the wall once the sanitary equipment has been pressed downwards.

[0057] Further to this, the tightening screws 368 of the securing device 369 are tightened to further improve the fixation.

[0058] Now turning to Fig. 7 another embodiment of a fixation arrangement is shown. The shrouded fixation arrangement is essentially the same as previously described, whereby the same reference numerals are used also for this embodiment. However, in this embodiment the fixation device 300 includes an inverted U-shape 356 while the receiving member 352 includes the tapered lugs 310. Since the relative positions of the fixation device 300 and the receiving member 352 provide the connection between the wedge shaped member 310 and the U-shape 356 in a manner similar to what has previously been described, the sanitary equipment 10 will be securely attached to the wall 20 also for this embodiment.

[0059] The receiving member 352 and the fixation device 300 may preferably be made as rigid pieces without any moving parts. The members 300, 352 may thus be constructed in robust materials such as metal or plastic.

[0060] The present invention has been described above with reference to specific embodiments. However, other embodiments are equally possible within the scope of the invention. The invention is thus only limited by the appended claims.

[0061] It is also to be understood that the present invention not only may be used for WC bowls suspended from a wall structure; the invention may be used for mounting any kind of sanitary equipment that is attached to a wall structure, e.g. wash basins, bidets, urinals and the like.

Claims

1. A ceramic sanitary equipment to be attached to a wall (20) by means of at least one bolt, comprising a main body (11) and a rear end (14) integrally formed with said main body (11) and facing said wall (20) when attached, wherein
said rear end (14) comprises at least one area (17, 18) onto which a shrouded fixation device (300) is securely attached by means of an adhesive material, said shrouded fixation device (300) being provided for engagement with an associated fixation support (350) of said wall (20).

2. The sanitary equipment according to claim 1, wherein said rear end (14) is formed by a molding process involving only positive draft angles.

3. The sanitary equipment according to claim 1 or 2, wherein said at least one fixation device (300) is secured to said respective area (17, 18) by means of glue.

4. The sanitary equipment according to any one of claims 1-3, wherein said at least one area (17, 18) surrounds the respective fixation device (300) along at least a part of the length of said fixation device (300).

5. The sanitary equipment according to any one of claims 1-4, wherein said area (17, 18) is formed as a recess.

6. The sanitary equipment according to any one of the preceding claims, wherein said shrouded fixation device (300) is configured to be clamped within said associated fixation support (350) of said wall (20).

7. The sanitary equipment according to any one of the preceding claims, wherein said fixation device (300) includes a first portion (320) which is inserted into said recess (17, 18), and a second portion (310) which extends out from said recess (17, 18) such that it faces the wall (20) when attached, wherein said second portion (310) comprises a tapered lug.

8. A fixation support for engagement with at least one fixation device (300) of a sanitary equipment (10) according to claim 7, comprising at least one receiving member (352) being configured to be securely

attached to bolts (22) extending out from said wall (20), wherein said receiving member (352) forms a U-shape (356) for receiving the tapered lug (310) of said fixation device (300).

9. The fixation support according to claim 8, wherein said fixation support (350) extends laterally such that it may engage with two laterally spaced fixation devices (300).

10. The fixation support according to claim 9, wherein said fixation support (350) further includes a plurality of laterally spaced apart through holes (354).

11. The fixation support according to any one of claims 8-10, further comprising a securing device (369) for locking said fixation support (350) to said sanitary equipment (10).

12. The fixation support according to claim 11, wherein said securing device (369) includes at least one hollow sleeve (364) for surrounding the bolt (22), and a tightening screw (368) for tilting said sleeve (364) relative said bolt (22).

13. The fixation support according to claim 12, wherein said tightening screw (368) is accessible via holes in the sanitary equipment (10).

14. A method for providing a ceramic sanitary equipment to be attached to a wall, comprising the steps of:

providing a main body,
providing a rear end integrally formed with said main body and facing said wall when attached, wherein said rear end is molded such that it comprises at least one area, and
securely attaching a fixation device onto said area by means of an adhesive material.

15. The method according to claim 14, wherein the steps of providing the main body and the rear end is performed by high pressure casting.

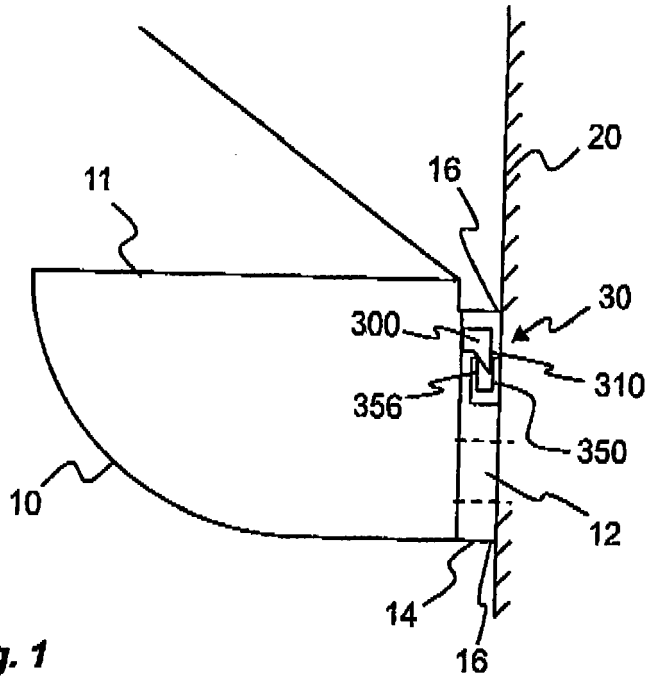

Fig. 1

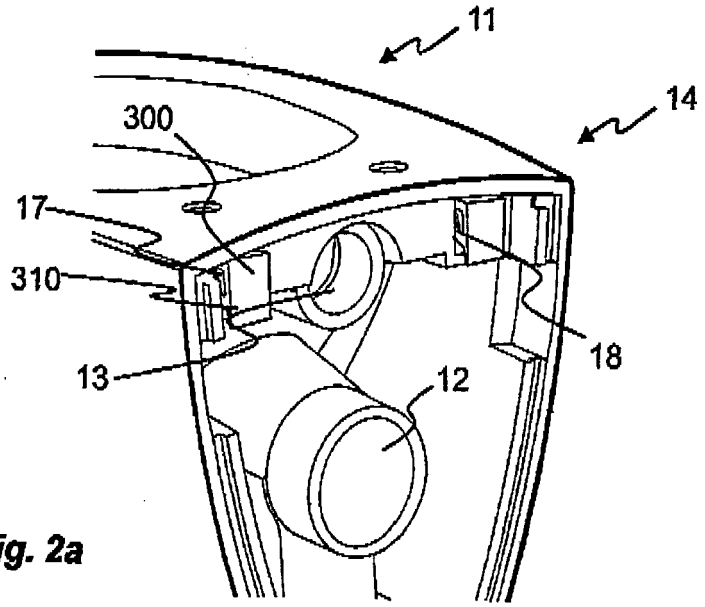

Fig. 2a

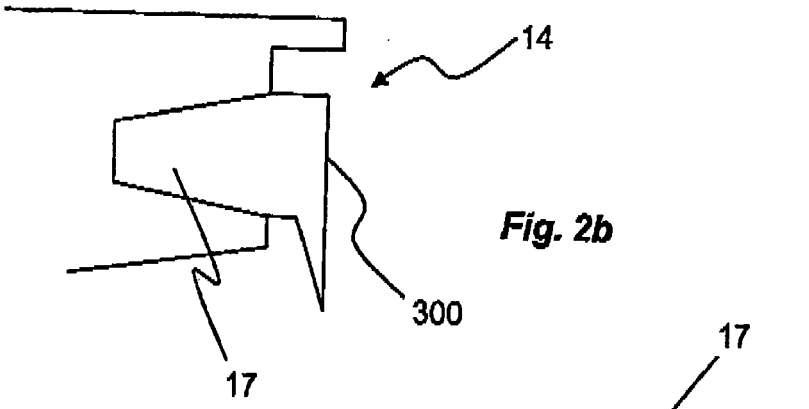

Fig. 2b

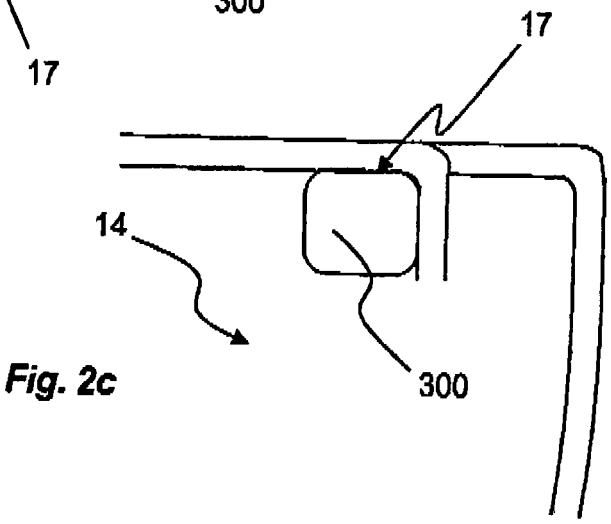

Fig. 2c

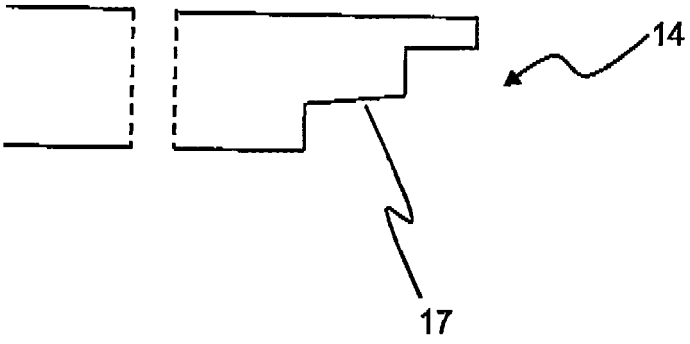

Fig. 2d

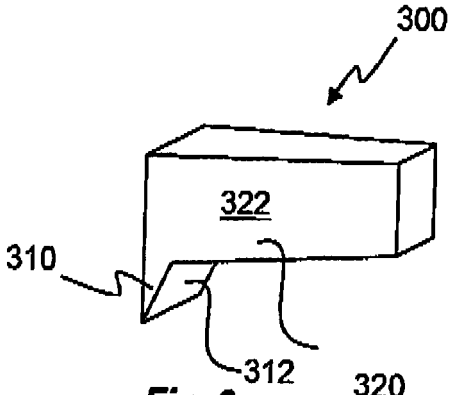

Fig. 3

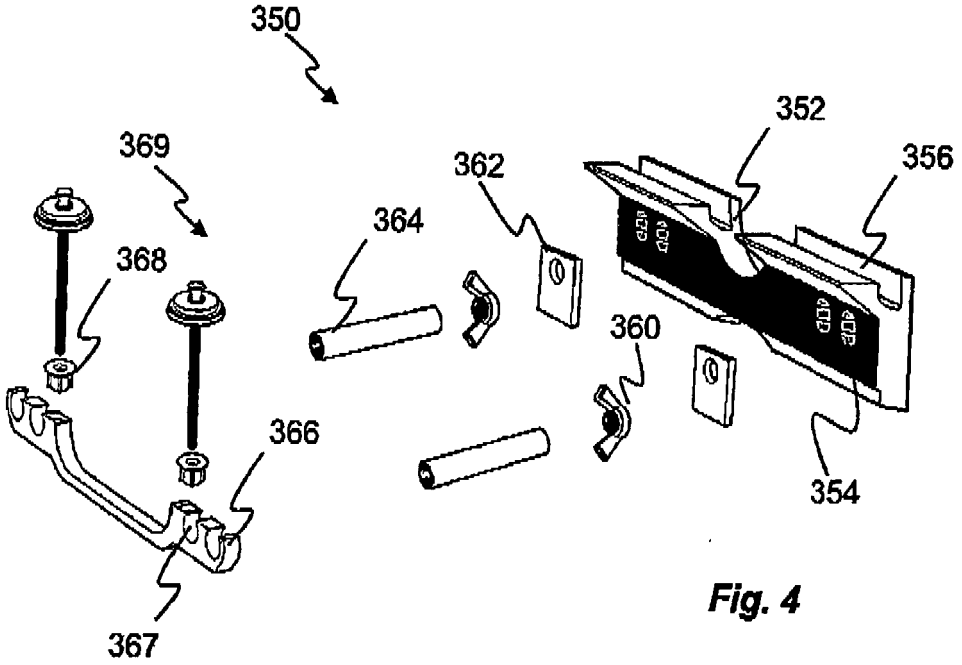

Fig. 4

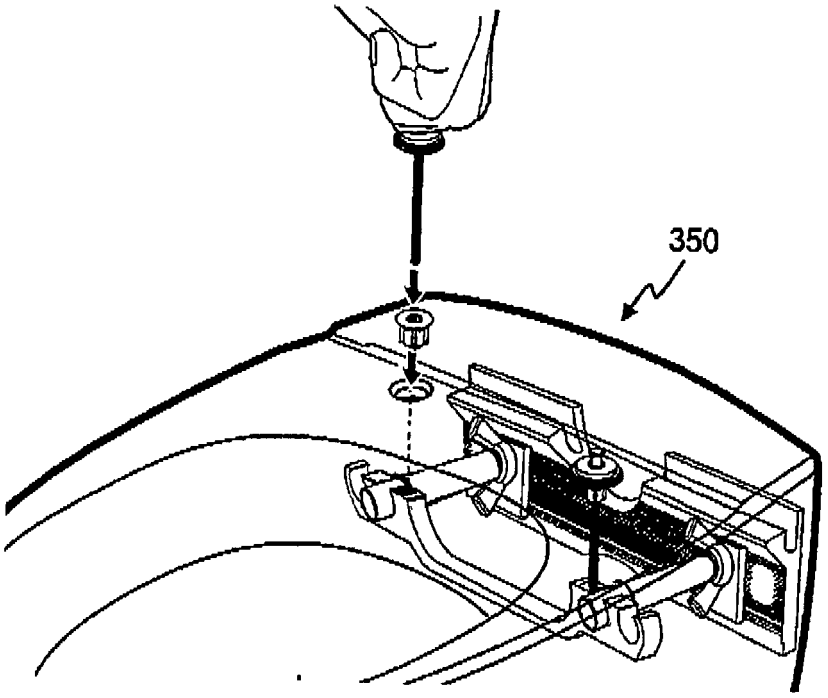

Fig. 5

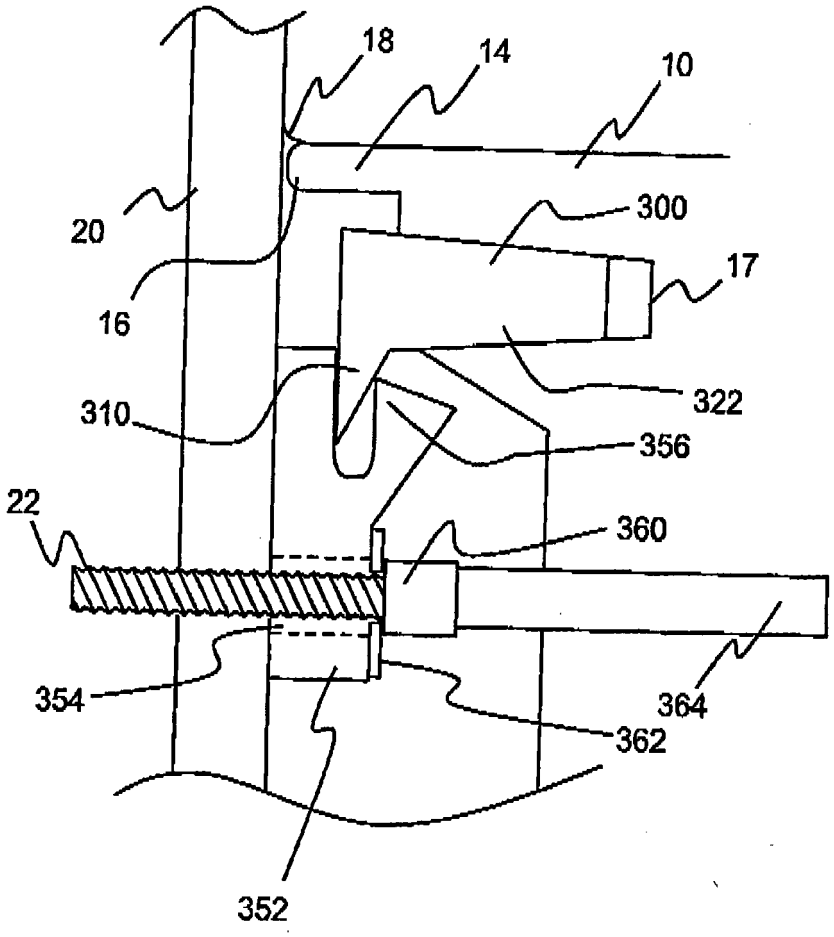

Fig. 6

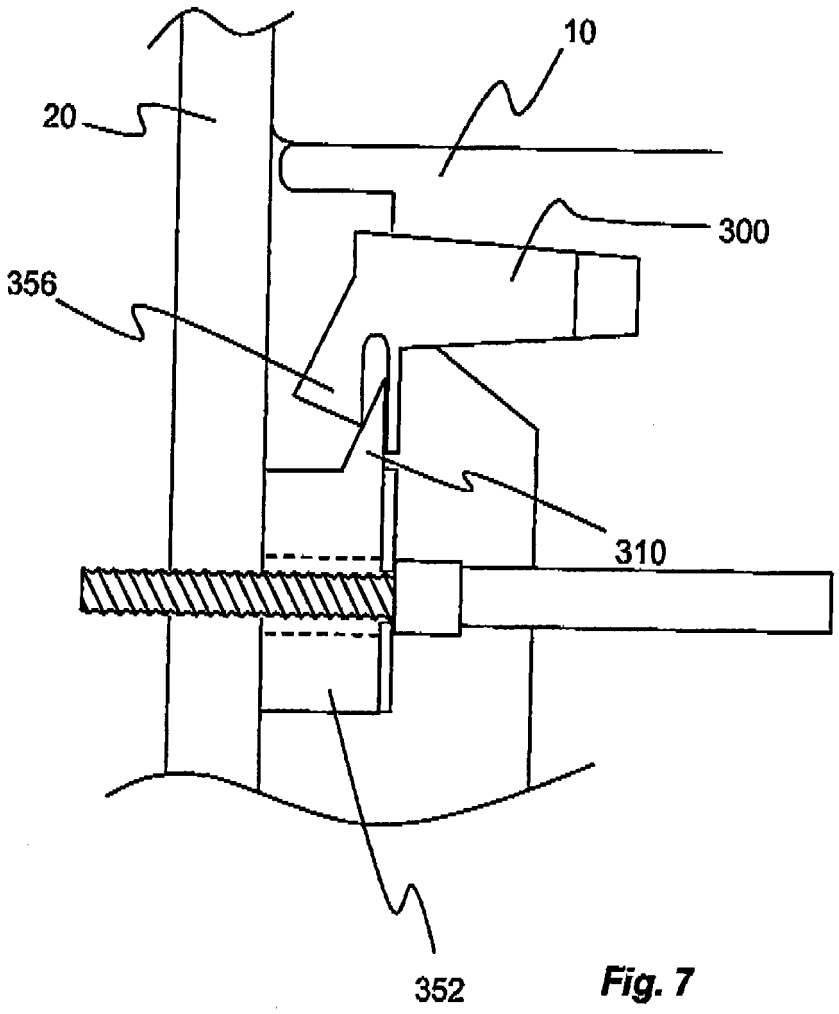

Fig. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 13 00 0385

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	DE 20 2008 016297 U1 (KERAMAG KERAMISCHE WERKE AG [DE]) 5 March 2009 (2009-03-05) * the whole document *	1,3-6,14 2,7, 11-13,15	INV. E03D11/14
X Y	US 4 008 872 A (THOMPSON RICHARD W) 22 February 1977 (1977-02-22) * the whole document *	8-10 7	
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TECHNICAL FIELDS SEARCHED (IPC)

E03D
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	24 June 2013	Horst, Werner

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 13 00 0385

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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24-06-2013

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82